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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK, VOLUME 96, A-7E AIRC--ETC(U)
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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK

Volume 96

A-7E Aircraft, Far-Field Noise

Robert G. Powell

JUN 1977

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AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
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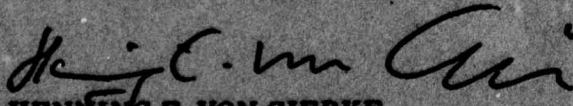
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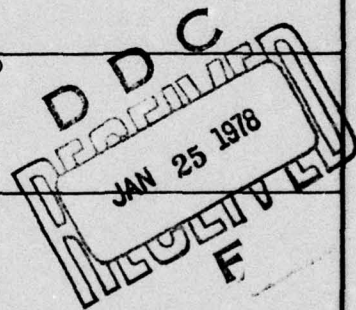
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FOR THE COMMANDER


HENNING E. VON GIERKE
Director
Biodynamics and Bionics Division
Aerospace Medical Research Laboratory
AIR FORCE/56780/3 January 1977 - 300

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The USN A-7E is a carrier based, light attack aircraft powered by one TF41-A-2 turbofan engine. This report provides far-field measured and extrapolated data defining both physical and psycho-acoustic measures of the bioacoustic environments produced by this aircraft operating on a ground runup pad for four engine/power conditions. Far-field data measured at 17 locations are normalized to standard meteorological conditions and extrapolated from 75-		



8000 meters to derive sets of equal-value contours as a function of angle and distance from the source. These contours are measures of: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, *USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application*, AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author gratefully acknowledges Mr. John Cole for his assistance in preparing this report, Capt Nick Farinacci, Mr. Harald Hille, and Mr. Jerry Speakman for their assistance in acquiring the raw data, Mr. Keith Kettler, Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton for assistance in the mechanics of data processing, and Mrs. Peggy Massie and Mr. Mike Patterson for assistance in typing and preparation of the graphics.

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INTRODUCTION

The USN A-7E is a carrier based, light attack aircraft powered by one TF41-A-2 turbofan engine. The aircraft was manufactured by the Vought Aeronautics Division of Ling, Tempco and Vought and the engines by the Allison Division of the General Motors Corporation.

This volume provides measured and extrapolated data defining bioacoustic environments produced by this aircraft during ground runup operations. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with ground runups of the A-7E aircraft.

This volume is one of a series published by the AMRL under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of military aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during *ground operations* of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Volume 2 provides a method and data for adjusting the handbook's far-field noise data, which are for standard meteorological conditions (15 C temperature, 70% relative humidity, 0.760 meter Hg barometric pressure), to derive comparable data for other meteorological conditions. *Refer to Volumes 1 and 2* (references 1 and 2) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published and is available upon request from AMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of each updated index.

Direct any questions concerning the technical data in this report and other handbook volumes to: AMRL/BBE, Wright-Patterson AFB, OH 45433, AUTOVON 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1) Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.
2. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate Effects of Non-standard Meteorological Conditions on Far-Field Noise*, AMRL-TR-75-50 (2), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

FAR-FIELD NOISE

MEASUREMENTS

AMRL acquired the far-field data during a 1-hour test period, thus keeping similar meteorological conditions throughout the test. Figure 1 shows the ground runup area (taxiway), ground cover, aircraft orientation and microphone measurement sites on the semicircle. The center of the 75 meter radius semicircle used in surveying the TF41-A-2 engine was on the ground directly below the intersection of the aircraft's centerline and the plane passing through the engine's exhaust-nozzle exit. The ground runup area did not have a blast deflector; therefore, the engine's exhaust was in a "free-flow" condition.

Table 1 provides cockpit readouts of engine characteristics (% RPM, fuel flow, etc.) for each power setting used in the far-field tests. Also listed in this table are the surface meteorological conditions during data acquisition.

All microphone measurement sites are in the acoustic far-field of the source where the sound wave-fronts spherically diverge and the noise source may be regarded as a point source.

A portable microphone/tape-recorder system was used to sequentially record the noise at each far-field location. The microphone was attached to a hand-held pole, pointed at the source (0° angle of incidence) and vertically scanned from 0.5 to 3 meters for a period of 5-10 seconds during data acquisition at each microphone location. These samples were then time-integrated to derive a root-mean-square sound pressure level. Vertical scanning and time-integrating together reduce anomalies frequently present in data acquired by a fixed height microphone.

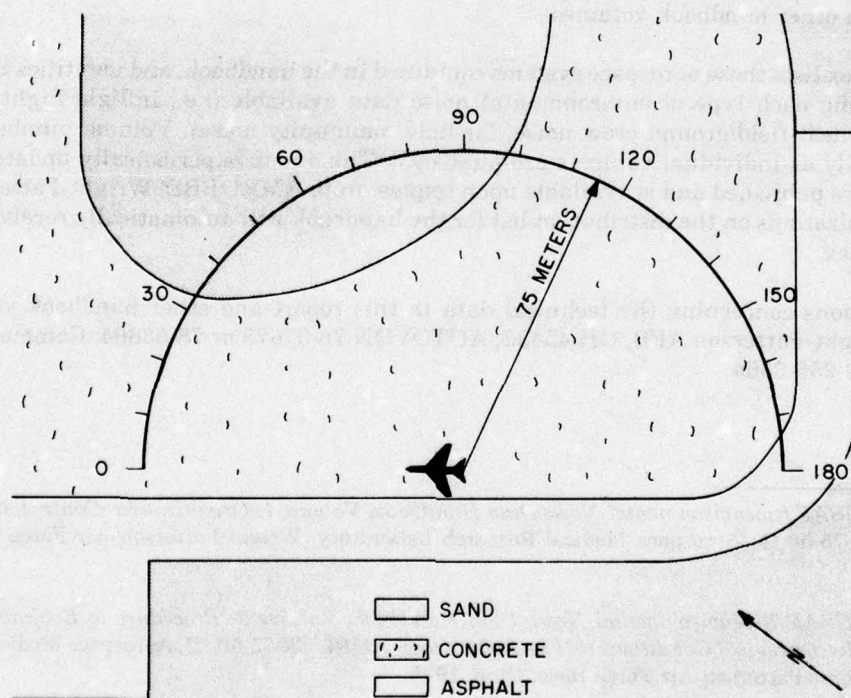


Figure 1. Far-Field Measurement Locations on The Taxiway at ALF, San Clemente Island

TABLE 1
TEST CONDITIONS
FOR FAR/FIELD NOISE MEASUREMENTS

A-7E Aircraft, Ground Runups, ALF, San Clemente Island
15 May 1973

Aircraft Engine Operation

Idle	EPR Did Not Register 55 % RPM, Core Speed 432 C, Turbine Outlet Temp 1200 LBS/HR, Fuel Flow
70% Runup	EPP Did Not Register 70 % RPM, NC 422 C, TOT 1550 LBS/HR, FF
85% Runup	EPR Did Not Register 85 % RPM, NC 400 C, TOT 3700 LBS/HR, FF
Intermediate (Military)	3.88 Engine Pressure Ratio 94 % RPM, NC 590 C, TOT 9000 LBS/HR, FF

Meteorology

Temperature	17.8 C
Bar Pressure	0.767 M Hg
Rel Humidity	60 %
Wind — Speed	3.1 M/Sec (6 KTS)
— Direction	350 Deg

RESULTS

Table 2 lists the overall and 1/3 octave band SPL measured at the far-field locations under meteorological conditions at the time of the test. Data in all other figures and tables are based on these levels. These data were normalized to 100 meters distance and standard meteorological conditions (15 C temperature, 70% relative humidity, 0.760 meter Hg barometric pressure) and used to derive the graphic data in Figure 2, which provides a compact summary of far-field noise characteristics of the A-7E aircraft in a standard format.

Figure 3 and Table 3 present two basic acoustic measures, the acoustic power level and the directivity index, respectively. The acoustic power level describes the power radiated by the source as a function of frequency. The directivity index is a standard acoustical engineering measure that describes the geometric way in which the source radiates this power as a function of both frequency and angle from source. These basic source measures are primarily of interest for acoustical engineers and noise generation/control specialists.

Estimates of the noise levels for intermediate power settings (e.g., 90% RPM) can be determined as explained in Volume 1 of this handbook.

Figures 4 through 10 are sets of equal noise contours describing seven different measures of noise as a function of angle and distance from the source for standard day meteorology. They are, respectively, overall sound pressure level, C-weighted sound level, A-weighted sound level, perceived noise level, speech interference level, permissible exposure times for personnel and octave band sound pressure levels.

Data excessively influenced by spurious background/electronic noise were eliminated from all figures and tables. No data are presented at the 170/180 degree locations for the idle and 70% RPM, nor at the 160/170/180 locations for the 85% RPM and the military power settings because of turbulent air flow behind the aircraft. Typically, the A-weighted levels for these angles are 10 to 20 dBA below the level measured at the preceding microphone location.

Test personnel performed noise surveys during quiet periods when the background noise was minimal, e.g., early in the morning when no other aircraft or engine test stands were operating. Data eliminated because they were near the background/electronic noise were generally not significant because the levels were so low (e.g., Table 2, idle power).

Volume 2 of the handbook describes the influence of meteorology on far-field noise environments, and provides, if required, the factors necessary to adjust the handbook's standard meteorological day data.

TABLE:		MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:								
1/3 OCTAVE BAND		DISTANCE = 75 METERS										OMEGA 1.4								
2												TEST 75-002-005								
NOISE SOURCE/SUBJECT:		OPERATION:										RUN 01								
A-7E AIRCRAFT		IDLE POWER										06 MAY 75								
TF-41 ENGINE		55% RPM										PAGE 2								
FAR FIELD NOISE		FREE FLOW																		
		METEOROLOGY:																		
		TEMP = 18 C																		
		BAR PRESS = .767 M HG																		
		REL HUMID = 60 %																		
		ANGLE (DEGREES)																		
		0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180																		
FREQ	(HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25													66<	66<	69<	67<	71<	71<	72<	
31.5	66<	66<	66<	67<	66<	65<	65<	66<	65<	66<	67<	67<	69<	71<	73	75	76	76	76	
40	70<	69<	71<	73<	72<	66<	66<	66<	71<	73<	70<	75	78	79	79	79	81	81	81	
50	67<	68<	71	71	70	64<	70	64<	71	65<	72	74	72	73	77	77	78	76	76	
63	67<	69<	71	72	67<	69<	72	68<	70	74	75	76	75	76	76	78	79	77	77	
80	66<	67<	69	68<	65<	69	65<	65<	66<	70	71	74	75	76	75	77	79	78	75	
100	68	68	70	69	68	68	68	68	67	70	72	73	76	77	78	79	78	76	76	
125	74	71	68	72	69	72	70	71	70	72	73	77	79	80	80	83	83	78	78	
160	72	71	65<	72	68	67	67	67	68	68	71	75	77	78	78	80	80	79	75	
200	70	71	66	70	68	69	67	67	68	69	74	78	79	81	79	80	80	76	75	
250	67	66	71	70	66	67	67	67	68	69	73	77	79	81	81	78	79	75	75	
315	67	67	70	69	65	66	63	65	64	68	74	76	78	79	76	79	75	73	73	
430	68	69	69	70	68	65	63	65	65	69	74	76	79	77	77	77	72	73	73	
500	70	69	70	72	69	66	65	66	66	71	76	75	78	80	79	74	73	72	74	
630	72	74	73	72	69	66	64	64	64	65	69	74	76	79	76	74	73	72	74	
800	71	72	71	70	69	65	63	63	63	65	68	74	76	79	76	74	69	69	69	
1000	75	75	75	75	74	71	66	64	64	67	74	75	79	75	72	72	68	70	71	
1250	89	87	90	92	91	88	82	79	76	73	77	79	80	77	74	70	71	71	71	
1600	77	76	77	78	76	72	67	66	66	71	77	76	76	76	73	72	67	70	70	
2000	80	80	78	81	78	77	69	68	66	69	75	74	76	70	70	67	70	70	70	
2500	81	81	81	83	80	78	75	71	66	63	69	76	76	78	74	70	69	70	70	
3150	77	77	78	77	78	75	71	66	63	63	69	77	76	79	73	69	67	66	66	
4000	78	78	79	78	80	77	73	68	66	62	78	77	79	74	71	66	68	68	64	
5000	81	81	81	80	77	77	70	65	62	57	75	74	76	72	72	69	66	64	64	
6300	79	79	79	78	78	75	71	65	61	55	72	72	74	71	69	64	62	62	62	
8000	79	78	77	75	77	74	69	64	60	64	72	73	75	73	70	65	62	62	62	
10000	74	75	73	72	71	69	63	59	57	62	70	69	69	67	65	59	57	57	57	
OVERALL		92	91	92	94	93	90	85	83	82	84	89	90	92	91	91	90	88	88	
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																				

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)																	IDENTIFICATION:		
1/3 OCTAVE BAND																			
DISTANCE = 75 METERS																	OMEGA 1.4		
																	TEST 75-002-005		
NOISE SOURCE/SUBJECT:																	RUN 02		
OPERATION:																			
A-7E AIRCRAFT																			
TF-41 ENGINE																	METEOROLOGY:		
FAR FIELD NOISE																	TEMP = 18 C		
																	BAR PRESS = .767 M HG		
																	REL HUMID = 60 %		
																	PAGE 2		
FREQ (HZ)																	ANGLE (DEGREES)		
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180																			
25	70<	66<	66<	65<	66<	69<	68<	70<	69<	68<	70<	67<	70<	70<	74<	76	75<		
31.5	77	76	78	77	74	72<	75	78	77	77	81	81	85	85	86	88	85		
40	87	86	86	85	76	82	86	84	81	88	88	88	92	94	93	95	90		
50	80	79	79	77	75	79	78	76	80	80	82	84	86	88	89	89	85		
63	80	80	79	76	79	80	76	79	78	81	83	86	87	90	91	90	85		
80	78	77	77	76	77	76	78	75	77	72	80	84	86	87	88	89	80		
100	75	73	75	77	75	75	75	76	75	76	81	82	84	86	87	87	76		
125	71	72	75	72	74	71	72	71	72	75	77	79	80	83	85	84	70		
160	71	70	72	70	70	70	70	72	72	75	79	80	82	83	83	82	66		
200	74	73	72	72	71	71	70	71	71	74	78	81	82	83	80	80	61<		
250	73	72	72	73	71	71	69	69	70	75	79	80	84	85	80	80	59<		
315	71	72	71	72	71	68	68	68	70	73	77	80	82	82	79	76	55<		
400	72	72	73	73	71	69	68	68	70	75	79	82	85	83	79	77	57<		
500	72	73	72	73	72	69	68	68	71	76	79	82	84	82	77	77	60		
630	76	78	77	76	75	71	70	67	69	74	78	81	82	78	75	73	57		
800	79	79	78	76	75	72	70	67	68	73	77	81	81	76	75	74	56		
1000	78	79	77	76	75	70	69	67	67	74	78	81	78	76	74	70	55		
1250	84	86	86	90	86	80	80	73	73	77	80	83	77	75	76	73	57		
1600	91	93	92	93	90	86	86	73	74	79	79	84	77	77	77	75	59		
2000	84	83	82	81	79	77	78	70	68	74	77	81	74	74	71	68	54		
3150	84	84	85	85	85	91	86	77	72	76	80	83	80	76	73	71	57		
4000	85	85	85	84	84	83	80	73	69	76	82	83	83	77	73	71	56		
5000	84	83	82	84	81	80	78	73	68	76	84	86	83	78	74	71	55		
6300	81	81	79	80	79	78	75	69	66	73	78	82	79	76	73	69	54		
8000	79	79	77	78	76	74	71	65	64	71	76	78	77	75	72	67	52		
10000	75	74	73	73	71	70	67	62	62	68	72	74	74	70	68	63	49		
OVERALL	96	97	96	97	94	94	93	89	88	92	94	97	98	98	98	99	93		
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																			

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:									
1/3 OCTAVE BAND										OMEGA 1.4									
2										TEST 75-002-005									
DISTANCE = 75 METERS										RUN 03									
NOISE SOURCE/SUBJECT:										METEOROLOGY:									
(OPERATION:										TEMP = 18 C									
(A-7E AIRCRAFT										BAR PRESS = .767 M HG									
(TF-41 ENGINE										REL HUMID = 60 %									
(FAR FIELD NOISE										PAGE 2									
FREQ (HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	70<	69<	71<	70<	70<	70<	72<	73<	73<	74<	75<	77	80	85	95	90			
31.5	71<	71<	72	72	72	73	74	76	76	76	78	80	84	88	98	93			
40	73<	74	75	74	76	77	77	78	78	81	82	84	89	93	102	97			
50	74	75	76	75	77	76	79	80	80	82	86	89	95	97	106	101			
63	78	78	80	81	79	83	84	84	84	87	90	94	100	104	111	105			
80	77	77	78	79	79	81	82	82	82	86	88	91	96	101	109	103			
100	80	80	81	82	82	82	83	83	85	88	91	94	99	105	111	106			
125	82	81	81	82	82	82	83	85	85	89	93	95	101	106	111	106			
160	84	83	85	83	84	84	84	85	87	89	94	96	100	107	113	108			
200	84	84	85	84	83	84	83	85	86	90	95	97	101	106	113	108			
250	84	85	85	85	84	85	83	86	86	91	96	98	102	106	111	106			
315	84	85	85	85	86	85	84	86	86	92	96	98	102	104	106	101			
400	84	84	85	85	85	86	84	87	87	93	97	99	103	104	104	99			
500	82	84	84	85	85	85	84	86	86	92	96	98	102	103	102	97			
630	80	83	83	83	85	85	83	85	85	93	97	99	101	102	102	97			
800	80	82	82	83	85	84	83	85	85	92	95	97	100	100	101	95			
1000	80	82	82	82	84	84	83	84	84	92	93	96	98	98	99	93			
1250	79	80	81	81	83	83	82	83	83	89	91	92	94	96	96	91			
1500	81	81	82	82	83	84	82	84	83	89	91	92	94	93	92	87			
2000	84	85	85	83	84	83	82	83	82	89	91	92	93	91	89	84			
2500	90	91	90	89	89	90	87	89	87	93	95	91	93	90	86	81			
3150	88	90	87	85	86	87	83	85	83	90	93	93	92	89	84	79			
4000	87	89	86	84	83	83	81	84	81	90	93	93	92	89	85	80			
5000	88	89	89	87	86	85	82	83	81	89	92	92	92	87	84	79			
6300	86	87	86	85	84	84	80	81	80	87	89	89	87	85	80	75			
8000	83	85	83	83	81	80	77	79	79	87	89	89	86	85	79	74			
10000	79	81	78	78	77	77	73	76	75	83	85	86	83	81	75	71			
OVERALL	98	99	98	97	98	98	96	98	98	104	107	109	112	115	120	115			

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE:		MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATIONS:								
1/3 OCTAVE BAND		DISTANCE = 75 METERS										OMEGA 1.4								
2												TEST 75-002-005								
NOISE SOURCE/SUBJECT:		OPERATION:										METEOROLOGY:								
A-7E AIRCRAFT		MILITARY POWER										TEMP = 10 C								
TF-41 ENGINE		94% RPM										BAR PRESS = .767 M HG								
FAR FIELD NOISE		FREE FLOW										REL HUMID = 60 %								
												PAGE 2								
FREQ (HZ)		ANGLE (DEGREES)																		
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	77	76	79	79	79	80	81	82	83	84	84	82	79	88	92	93				
31.5	79	79	80	82	82	84	83	84	86	87	83	82	91	95	96					
40	82	83	83	85	85	85	86	87	89	90	86	88	95	99	100					
50	84	82	83	84	84	86	86	88	88	88	92	88	90	98	102	101				
63	85	85	85	86	87	87	87	89	89	91	93	92	92	102	105	104				
80	86	86	86	87	87	87	87	88	90	93	96	94	96	105	109	106				
100	90	89	89	90	89	90	91	91	93	96	99	98	100	110	112	109				
125	91	91	91	91	91	90	92	92	93	98	102	100	103	112	113	110				
160	95	93	95	93	93	93	92	94	95	99	103	101	105	115	115	112				
200	91	92	94	93	93	92	92	93	94	100	103	102	104	115	115	113				
250	93	96	96	96	94	95	92	95	97	101	105	104	106	114	116	115				
315	98	101	100	99	97	94	94	93	97	103	107	105	107	114	115	116				
400	107	107	108	107	104	99	97	96	98	104	107	106	108	114	115	115				
500	103	105	106	108	105	103	101	98	100	105	106	107	107	113	115	114				
630	100	104	106	108	106	105	103	101	101	106	108	107	107	112	113	113				
800	98	102	103	106	105	105	104	103	104	107	106	106	105	111	111	111				
1000	97	100	101	104	103	103	101	101	104	108	108	105	104	109	111	110				
1250	94	98	99	102	103	102	101	99	102	108	108	104	103	108	109	109				
1600	92	97	98	102	102	103	101	99	102	106	109	102	101	107	108	108				
2000	90	96	96	100	101	101	99	98	101	106	108	102	100	106	107	107				
2500	88	95	95	99	99	100	98	97	100	104	107	101	98	104	105	105				
3150	86	92	93	97	97	98	96	94	98	104	106	101	97	103	105	103				
4000	86	92	92	97	96	99	96	94	98	104	106	101	97	103	105	104				
5000	84	90	91	95	95	96	94	92	94	97	102	105	99	95	101	103	102			
6300	81	87	88	92	92	94	92	90	94	100	102	96	93	99	101	99				
8000	79	85	86	90	91	92	91	89	93	98	100	94	91	98	100	98				
10000	74	81	82	86	87	89	87	85	90	95	96	92	89	96	98	95				
OVERALL	110	113	113	115	114	113	111	110	112	117	119	116	116	124	125	124				
LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																				

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

FIGURE 1: NORMALIZED FARFIELD NOISE LEVELS

2 DISTANCE = 100 METERS

NOISE SOURCE/SUBJECT: (OPERATION:)

A-7E AIRCRAFT (70% RPM)

TF-41 ENGINE (FREE FLOW)

FAR FIELD NOISE ()

METEOROLOGY: TEMP = 15 C

BAR PRESS = .760 M HG

REL HUMID = 70 %

IDENTIFICATIONS: OMEGA 1.4

TEST 75-002-005

RUN 02

06 MAY 75

PAGE 6

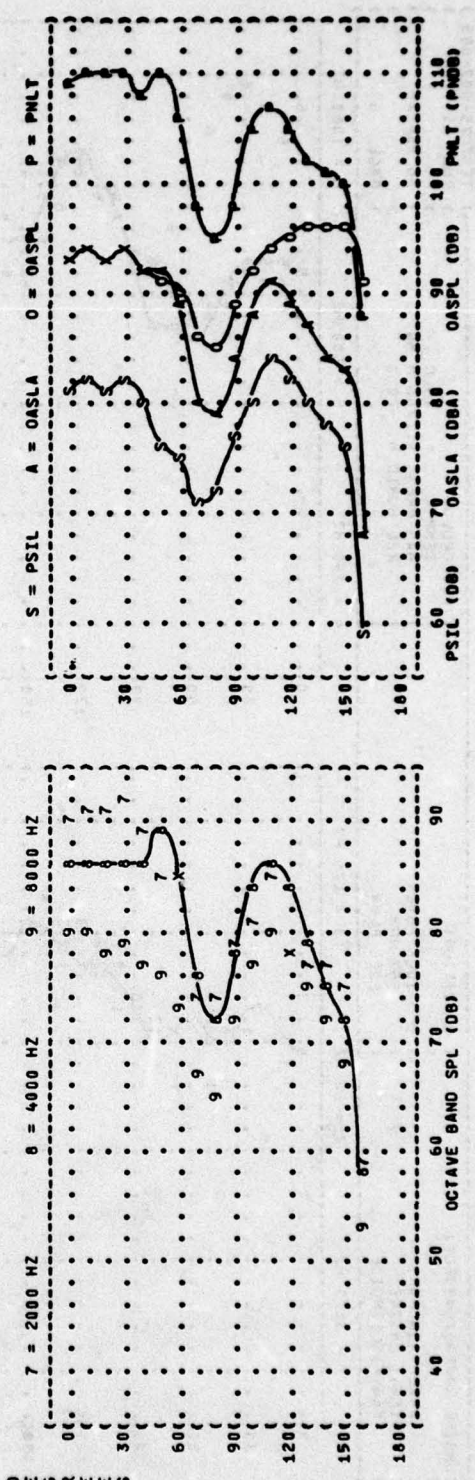
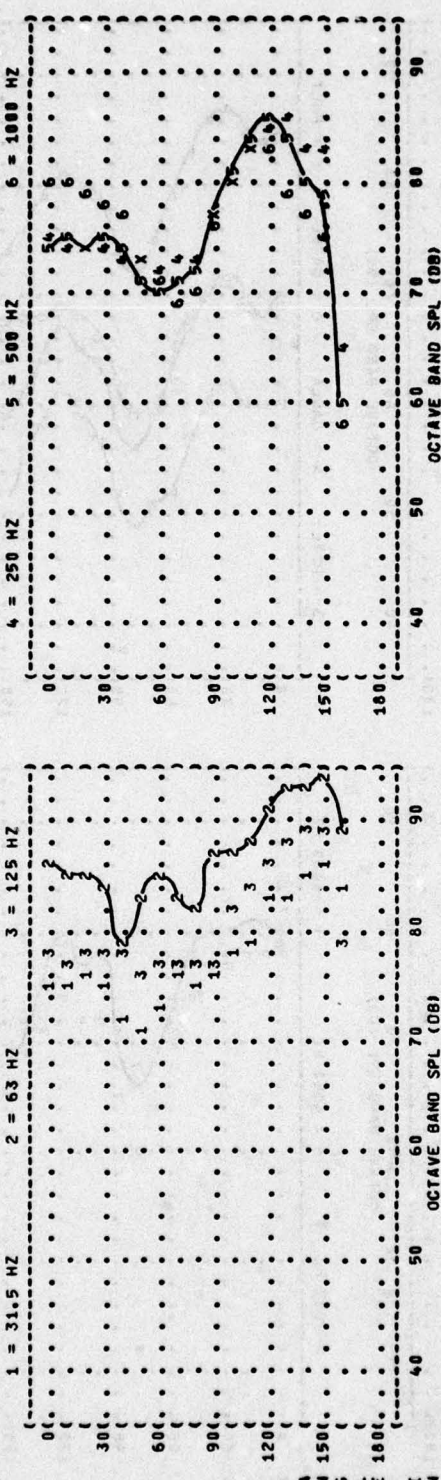


FIGURE 1 NORMALIZED FARFIELD NOISE LEVELS

2 DISTANCE = 100 METERS

NOISE SOURCE/SUBJECT: (OPERATION:)

A-7E AIRCRAFT ()

TF-41 ENGINE (85X RPM)

FAR FIELD NOISE (FREE FLOW)

METEOROLOGY: TEMP = 15 C

BAR PRESS = .760 M HG

REL HUMID = 70 %

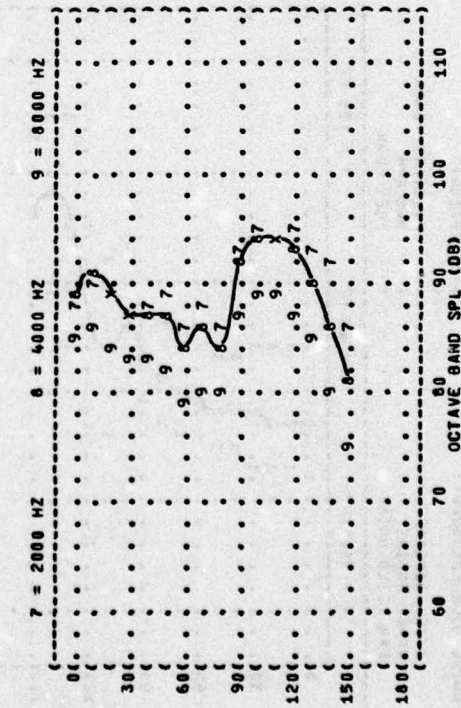
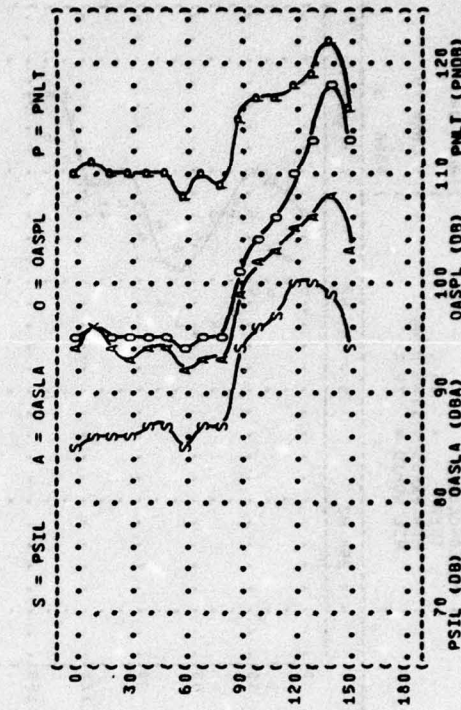
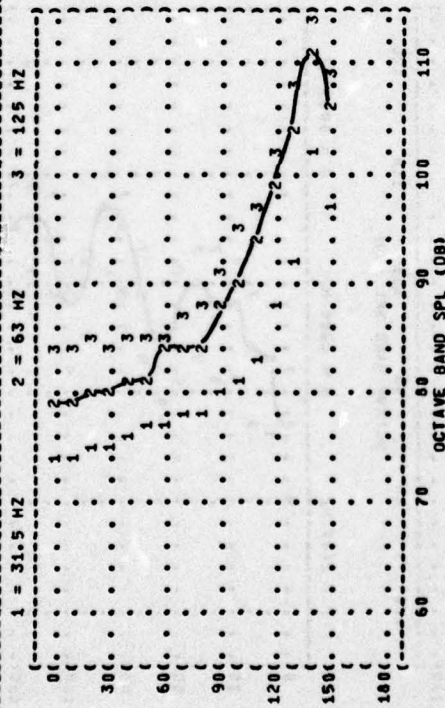
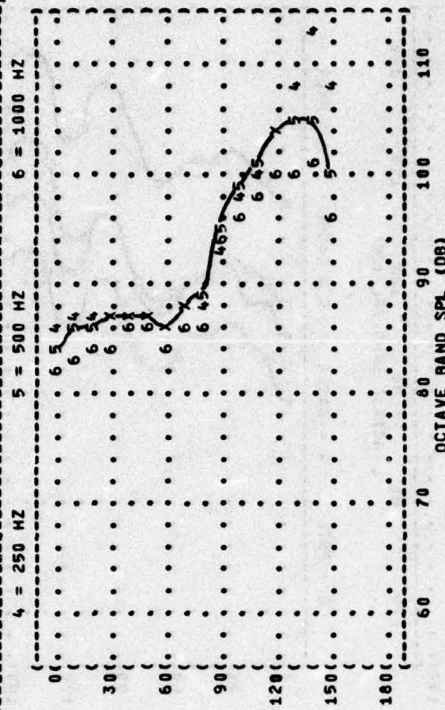
IDENTIFICATION: OMEGA 1.4

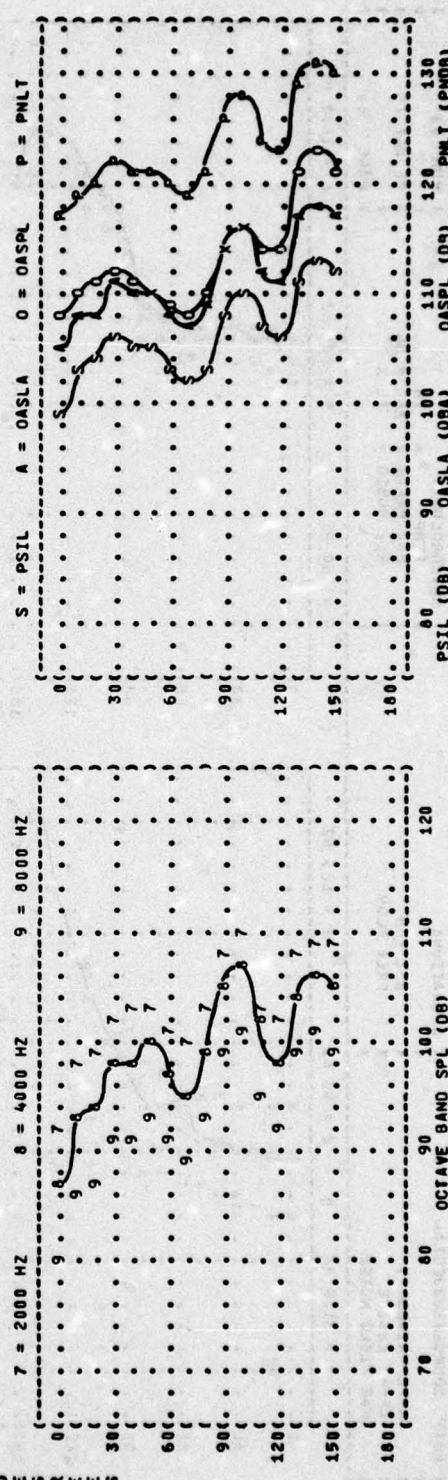
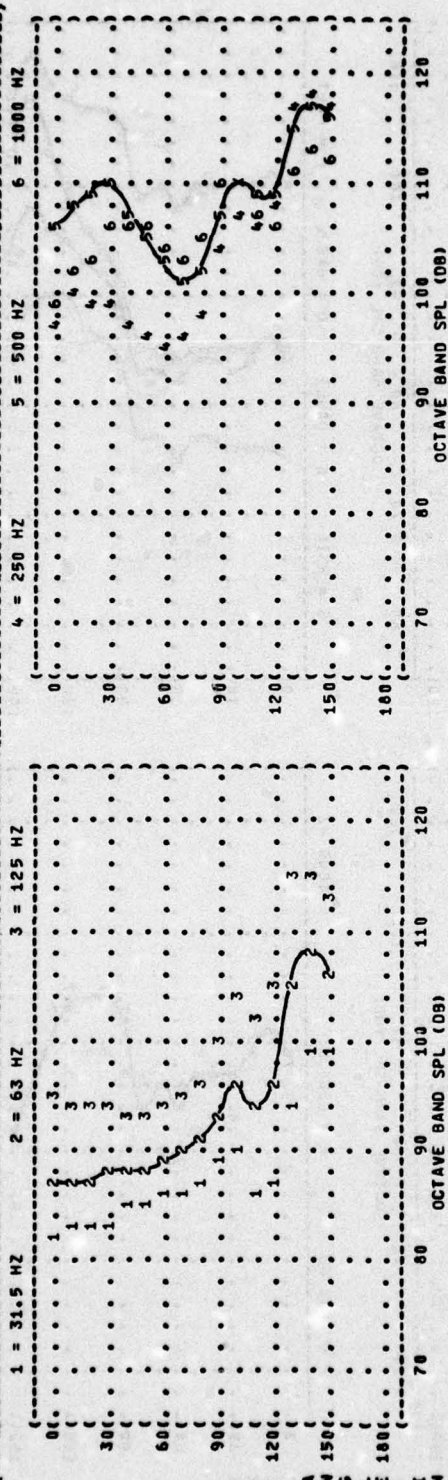
TEST 75-002-005

RUN 03

06 MAY 75

PAGE 6



[illegible]

((FIGURE: ACOUSTIC POWER LEVEL (PWL)))
 ((3))
 ((NOISE SOURCE/SUBJECT:))
 ((A-7E AIRCRAFT))
 ((TF-41 ENGINE))
 ((FAR FIELD NOISE))
 ((OPERATION:))
 ((IDLE POWER))
 ((55% RPM))
 ((FREE FLOW))
 ((METEOROLOGY:))
 ((TEMP = 18 C))
 ((BAR PRESS = .767 M HG))
 ((REL HUMID = 60 %))
 ((IDENTIFICATION:))
 ((OMEGA 1.4))
 ((TEST 75-002-005))
 ((RUN 01))
 ((06 MAY 75))
 ((PAGE 3))

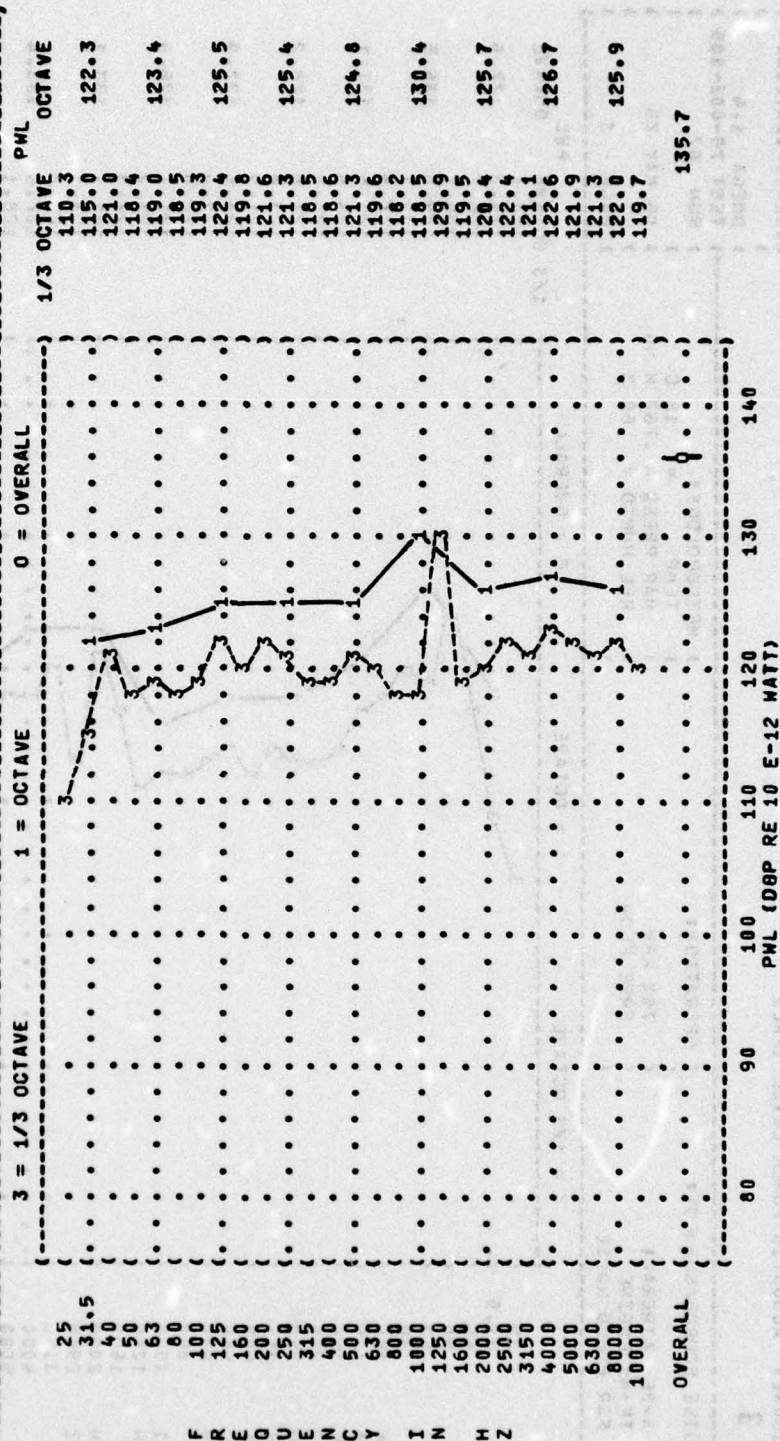


FIGURE: ACOUSTIC POWER LEVEL (PWL)

3

IDENTIFICATION:

OMEGA 1.4

TEST 75-002-005

RUN 03

06 MAY 75

PAGE 3

NOISE SOURCE/SUBJECT:

OPERATION:

85% RPM

FREE FLOW

METEOROLOGY:

TEMP = 18 C

BAR PRESS = .767 M HG

REL HUMID = 60 %

A-7E AIRCRAFT

TF-41 ENGINE

FAR FIELD NOISE

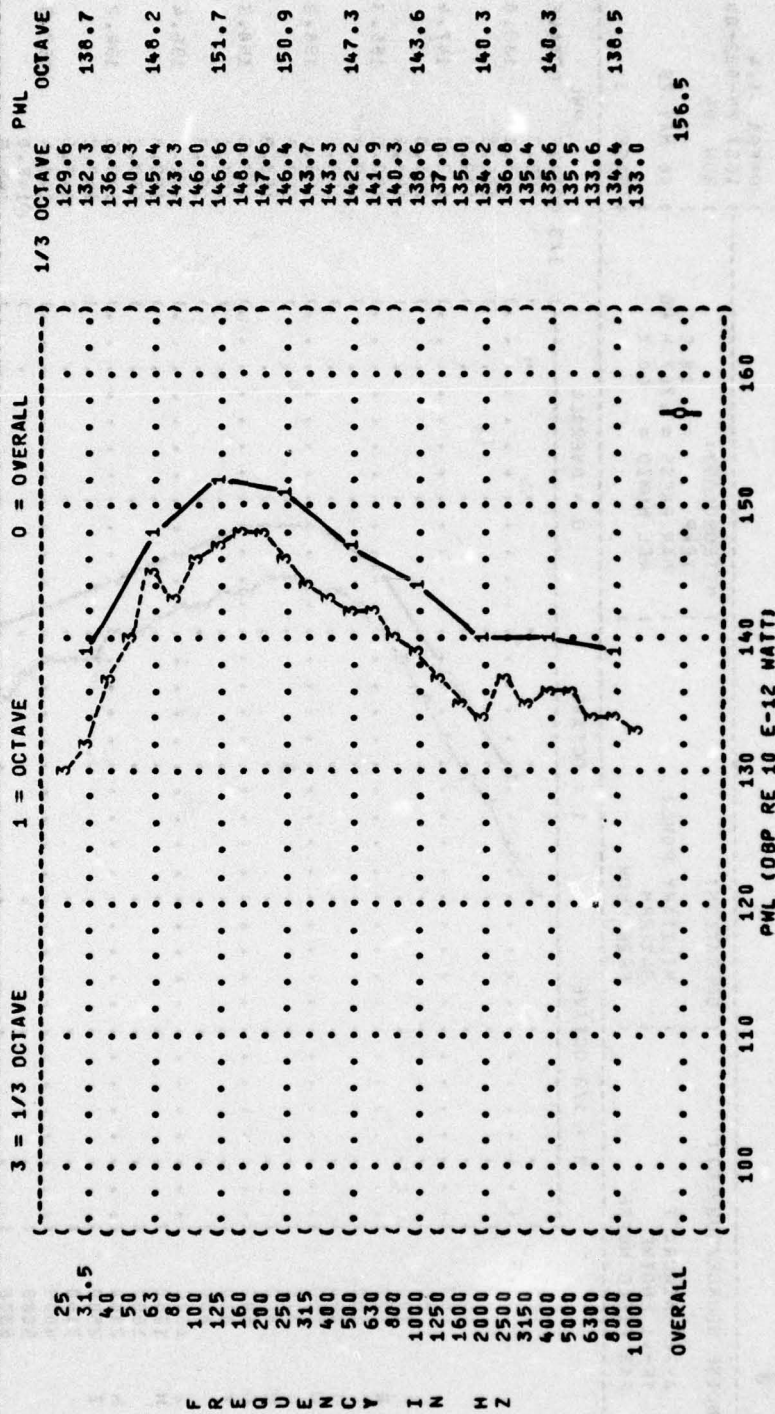


FIGURE: ACOUSTIC POWER LEVEL (PWL)

3

IDENTIFICATION:

OMEGA 1.4

TEST 75-002-005

RUN 04

06 MAY 75

PAGE 3

NOISE SOURCE/SUBJECT:

OPERATION:

MILITARY POWER

94% RPM

FREE FLOW

METEOROLOGY:

TEMP = 18 C

BAR PRESS = .767 M HG

REL HUMID = 60 %

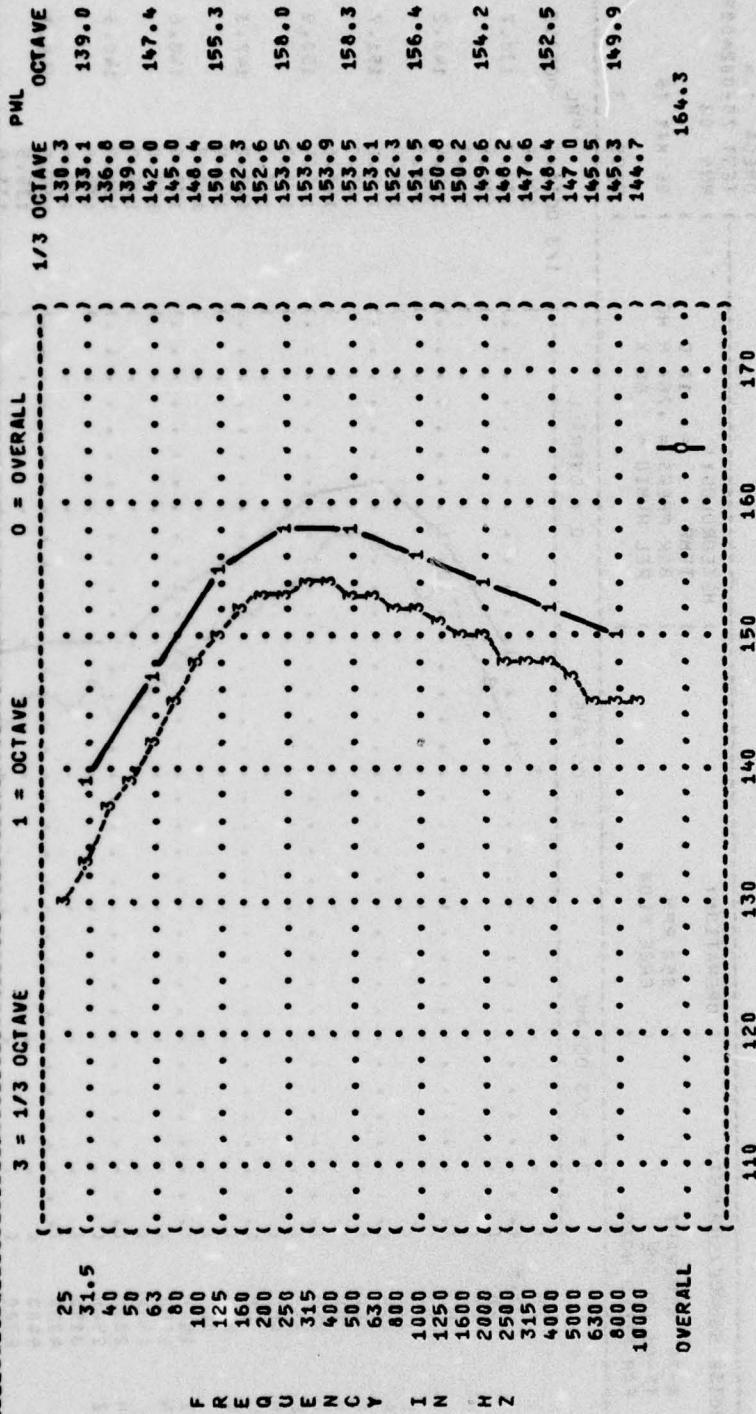


TABLE: DIRECTIVITY INDEX (DB)																	IDENTIFICATION:		
3																	OMEGA 1.4		
																	TEST 75-002-005		
NOISE SOURCE/SUBJECT:																	RUN 01		
(OPERATION:																			
(A-7E AIRCRAFT																			
(IDLE POWER																	18 C		
(TF-41 ENGINE																	BAR PRESS = .767 M HG		
(FAR FIELD NOISE																	REL HUMID = 60 %		
(FREE FLOW																			
METEOROLOGY:																			
TEMP																			
BAR PRESS = .767 M HG																			
REL HUMID = 60 %																	06 MAY 75		
																	PAGE 4		
ANGLE (DEGREES)																			
FREQ	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
(HZ)																			
1/3 OCTAVE																			
25	-4	-4	-4	-3	-4	-5	-10	-5	-3	-3	1	1	4	2	3	6	6	6	6
31.5	-6	-6	-4	-3	-4	-10	-4	-4	-3	-5	-3	-1	1	3	3	5	6	6	6
40	-6	-6	-2	-3	-4	-9	-4	-2	-8	-1	-1	-1	3	3	4	5	5	5	5
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200	-9	-10	-5	-6	-8	-9	-9	-8	-7	-3	1	3	5	5	5	2	3	2	2
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315	-6	-5	-4	-4	-6	-8	-11	-9	-9	-5	0	3	6	6	6	4	4	4	4
400	-6	-7	-6	-4	-7	-10	-11	-10	-10	-5	0	4	6	6	6	4	4	4	4
500	-2	-1	-1	-2	-3	-7	-10	-10	-9	-5	1	4	6	6	6	3	3	3	3
630	-1	-1	-2	-3	-3	-7	-9	-10	-8	-6	1	2	6	6	6	2	2	2	2
800	2	2	2	2	1	-2	-7	-9	-9	-11	-7	-5	4	4	4	-1	-5	-13	-13
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2500	3	3	3	3	3	1	-3	-7	-9	-4	2	2	2	2	2	-4	-9	-10	-10
3150	2	3	3	3	5	2	-4	-8	-12	-8	1	-0	2	2	2	-5	-9	-11	-11
4000	6	7	6	6	3	2	-2	-8	-13	-8	-1	-1	1	1	1	-4	-7	-10	-10
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10000	6	7	5	4	3	1	-5	-9	-11	-5	2	1	2	2	2	-3	-9	-11	-11
OCTAVE																			
31.5	-6	-6	-5	-3	-4	-9	-4	-5	-3	-5	-1	2	3	3	3	4	5	5	5
63	-7	-5	-3	-3	-6	-5	-4	-5	-5	-2	-0	1	1	1	1	5	5	5	5
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1000	5	2	5	6	7	3	-6	-9	-10	-5	-5	-3	-1	-1	-1	-7	-11	-10	-10
2000	5	5	4	4	3	1	-6	-7	-9	-5	1	1	2	2	2	-4	-7	-5	-5
4000	6	4	4	4	4	2	-4	-8	-11	-5	2	1	3	3	3	-5	-8	-9	-9
8000	6	6	5	4	4	2	-3	-8	-12	-8	-0	0	2	2	2	-2	-3	-8	-11
10000	6	7	5	4	3	1	-5	-9	-11	-5	2	1	2	2	2	-3	-9	-11	-11
OVERALL	3	1	3	4	3	0	-5	-7	-8	-5	-1	1	3	1	1	1	0	0	-2

TABLE: DIRECTIVITY INDEX (DB)																	IDENTIFICATION:		
3																	OMEGA 1.4		
NOISE SOURCE/SUBJECT:																	TEST 75-002-005		
A-7E AIRCRAFT																	RUN 02		
TF-41 ENGINE																	06 MAY 75		
FAR FIELD NOISE																	PAGE 4		
OPERATION:																	METEOROLOGY:		
70% RPM																	TEMP = 18 C		
FREE FLOW																	BAR PRESS = .767 H HG		
																	REL HUMID = 60 %		
ANGLE (DEGREES)																			
FREQ (HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
1/3 OCTAVE																			
25	-4	-2	-3	-3	-8	-5	-6	-4	-5	-1	-4	-2	2	2	6	8	6	6	6
31.5	-5	-5	-4	-5	-7	-10	-6	-4	-5	-5	-1	-2	3	3	5	6	6	3	3
40	-2	-3	-3	-4	-13	-7	-3	-5	-8	-4	-1	0	3	3	4	5	6	1	1
50	-4	-5	-5	-6	-9	-5	-9	-7	-4	-4	-2	1	2	2	6	6	6	1	1
63	-5	-5	-6	-6	-5	-7	-7	-5	-6	-10	-2	1	2	2	5	5	5	-0	-0
80	-4	-5	-6	-6	-5	-7	-7	-5	-6	-5	-1	1	2	2	4	5	7	-2	-2
100	-7	-7	-3	-6	-5	-7	-7	-5	-6	-3	-1	0	2	2	4	5	6	-6	-6
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250	-6	-4	-5	-5	-6	-6	-7	-7	-9	-4	1	3	5	5	3	2	2	-20	-20
315	-6	-4	-5	-5	-6	-6	-7	-7	-8	-4	1	3	6	6	4	1	1	-21	-21
400	-7	-7	-5	-6	-7	-9	-10	-9	-8	-3	1	4	6	6	2	1	1	-18	-18
500	-6	-5	-6	-5	-6	-9	-10	-9	-8	-3	1	5	4	4	0	1	1	-20	-20
630	-1	1	1	-1	-2	-5	-7	-9	-8	-1	-1	3	6	3	0	1	1	-21	-21
800	3	3	2	1	-1	-5	-6	-9	-8	-4	-1	2	4	0	-6	-8	-25	-25	-25
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2500	1	1	2	2	2	8	3	-6	-12	-4	1	2	2	2	-8	-10	-23	-23	-23
3150	4	4	2	3	1	2	-1	-8	-13	-5	3	5	3	3	-7	-10	-23	-23	-23
4000	3	3	2	3	2	1	-3	-8	-11	-4	1	4	3	3	-4	-7	-8	-8	-8
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10000	5	4	3	3	1	-1	-3	-9	-8	-3	2	4	3	3	0	-3	-8	-8	-8
OCTAVE																			
31.5	-5	-5	-4	-5	-8	-9	-7	-4	-5	-4	-1	-0	3	3	5	6	4	4	4
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OVERALL	1	1	1	1	-1	-1	-2	-7	-7	-3	-1	1	2	3	3	3	3	3	-2

TABLE: DIRECTIVITY INDEX (DB)										IDENTIFICATIONS:									
3										OMEGA 1.4 TEST 75-002-005 RUN 03									
NOISE SOURCE/SUBJECT:										METEOROLOGY:									
(OPERATION:										TEMP = 18 C									
(A-7E AIRCRAFT										BAR PRESS = .767 M HG									
(TF-41 ENGINE										REL HUMID = 60 %									
(FAR FIELD NOISE										PAGE 4									
FREQ (HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
ANGLE (DEGREES)																			
1/3 OCTAVE																			
25	-15	-15	-14	-15	-14	-14	-12	-11	-12	-10	-9	-8	-5	1	11	6			
31.5	-16	-16	-15	-15	-14	-14	-14	-11	-11	-11	-9	-8	-4	1	11	6			
40	-18	-17	-16	-17	-16	-14	-14	-13	-13	-10	-10	-8	-2	2	11	6			
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100	-21	-21	-21	-19	-19	-18	-18	-17	-16	-13	-9	-7	-2	4	10	5			
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200	-19	-18	-19	-19	-19	-18	-19	-17	-16	-12	-7	-5	-2	4	10	5			
250	-17	-16	-16	-16	-17	-16	-18	-15	-15	-10	-5	-3	1	5	10	5			
315	-14	-14	-13	-13	-13	-13	-14	-13	-12	-7	-2	-0	4	6	8	3			
400	-14	-14	-13	-13	-13	-12	-14	-11	-11	-5	-1	1	5	6	6	1			
500	-15	-13	-13	-12	-12	-12	-13	-11	-11	-3	0	2	5	5	5	0			
630	-16	-14	-13	-13	-11	-12	-13	-11	-10	-3	0	2	5	5	6	0			
800	-15	-13	-13	-12	-10	-11	-12	-10	-10	-3	0	2	5	5	6	0			
1000	-13	-11	-11	-9	-9	-10	-9	-9	-9	-1	0	3	5	5	6	0			
1250	-12	-11	-10	-10	-8	-8	-10	-8	-8	-0	1	3	5	5	4	5			
1600	-9	-8	-8	-8	-6	-6	-8	-5	-6	-0	2	3	5	5	4	3			
2000	-5	-4	-4	-5	-5	-5	-7	-5	-6	1	2	4	5	5	3	1			
2500	-1	-1	-1	-2	-1	-0	-3	-2	-4	3	5	1	2	-1	-5	-10			
3150	-1	1	-2	-4	-3	-2	-6	-4	-6	1	4	4	3	0	-5	-10			
4000	-2	0	-3	-5	-5	-5	-8	-5	-7	2	4	5	3	1	-4	-9			
5000	-0	1	-1	-1	-2	-3	-6	-5	-7	1	4	4	4	-1	-4	-9			
6300	1	2	1	-1	-1	-1	-5	-5	-5	2	3	4	2	-0	-5	-10			
8000	-1	0	-2	-2	-4	-4	-7	-5	-5	2	4	5	2	0	-6	-11			
10000	-2	-0	-3	-3	-4	-4	-8	-5	-6	2	4	5	2	0	-6	-10			
OCTAVE																			
31.5	-17	-17	-16	-16	-15	-14	-14	-12	-12	-11	-9	-8	-3	1	11	6			
63	-22	-21	-21	-20	-19	-20	-17	-16	-16	-13	-10	-6	-1	3	10	5			
125	-20	-20	-19	-19	-19	-19	-18	-17	-16	-13	-9	-7	-2	4	10	5			
250	-17	-16	-16	-16	-16	-16	-16	-15	-15	-10	-5	-3	1	5	10	5			
500	-15	-13	-13	-13	-12	-12	-14	-11	-11	-5	-0	2	5	6	6	1			
1000	-14	-12	-12	-11	-9	-10	-11	-9	-9	-2	0	2	5	5	5	0			
2000	-3	-2	-3	-4	-3	-3	-5	-4	-5	2	3	2	4	2	0	-5			
4000	-1	1	-1	-1	-3	-3	-6	-4	-7	1	4	4	3	0	-4	-9			
8000	-0	1	-1	-1	-2	-3	-6	-5	-5	2	4	5	2	0	-5	-10			
OVERALL	-14	-12	-13	-14	-13	-13	-15	-13	-13	-7	-4	-2	1	4	9	4			

TABLE: DIRECTIVITY INDEX (DB)										IDENTIFICATION:									
3										OMEGA 1.4									
NOISE SOURCE/SUBJECT:										TEST 75-002-005									
(OPERATION:										RUN 04									
(A-7E AIRCRAFT										TEMP = 18 C									
(TF-41 ENGINE										BAR PRESS = .767 M HG									
(FAR FIELD NOISE										REL HUMID = 60 %									
(FREE FLOW										PAGE 4									
FREQ (HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
ANGLE (DEGREES)																			
1/3 OCTAVE																			
25	-9	-9	-7	-7	-7	-5	-4	-4	-2	-1	-1	-4	-6	2	6	8			
31.5	-9	-9	-9	-8	-6	-6	-4	-5	-4	-2	-1	-5	-6	3	7	8			
40	-10	-9	-8	-7	-7	-7	-6	-6	-4	-3	-2	-6	-4	3	8	8			
50	-10	-12	-11	-10	-10	-10	-8	-8	-6	-6	-4	-5	-5	5	9	7			
63	-12	-12	-11	-10	-10	-10	-9	-8	-8	-6	-4	-5	-5	5	9	7			
80	-14	-14	-13	-13	-13	-13	-12	-12	-10	-7	-4	-6	-4	5	9	6			
100	-14	-14	-14	-14	-14	-15	-13	-13	-10	-8	-4	-5	-3	6	8	6			
125	-14	-14	-14	-14	-14	-15	-13	-13	-12	-7	-3	-5	-2	7	8	5			
160	-12	-14	-12	-14	-14	-15	-13	-13	-12	-8	-4	-6	-3	8	8	5			
200	-16	-16	-13	-14	-14	-16	-15	-15	-13	-7	-4	-6	-3	8	8	6			
250	-15	-12	-12	-14	-14	-16	-16	-14	-12	-7	-3	-4	-3	6	8	7			
315	-10	-7	-9	-9	-11	-14	-15	-15	-11	-6	-1	-3	-1	6	7	8			
400	-2	-2	-0	-2	-5	-9	-12	-12	-10	-4	-1	-2	-1	6	7	6			
500	-5	-3	-2	-0	-3	-5	-7	-10	-8	-3	-0	-1	-1	5	7	6			
630	-7	-3	-2	-0	-2	-5	-6	-7	-7	-1	0	-0	-1	4	5	5			
800	-8	-5	-4	-1	-2	-3	-4	-3	-3	-0	1	-0	-2	4	4	4			
1000	-9	-6	-5	-2	-3	-3	-5	-5	-2	2	2	-1	-2	3	5	4			
1250	-11	-7	-6	-3	-2	-3	-4	-6	-3	3	3	-1	-3	3	4	4			
1600	-12	-7	-6	-2	-2	-2	-4	-5	-2	2	4	-2	-4	2	4	4			
2000	-14	-8	-8	-4	-3	-2	-5	-6	-2	2	2	-3	-3	2	3	3			
2500	-14	-7	-7	-3	-3	-2	-4	-5	-2	2	5	-1	-4	2	3	3			
3150	-15	-9	-8	-4	-4	-3	-5	-7	-3	3	5	-0	-4	2	4	2			
4000	-16	-10	-9	-4	-5	-2	-5	-7	-3	3	5	-1	-4	2	4	3			
5000	-16	-10	-8	-5	-5	-3	-5	-7	-2	3	5	-0	-4	1	4	3			
6300	-16	-10	-9	-5	-5	-3	-5	-7	-3	3	5	-1	-4	2	4	2			
8000	-17	-11	-9	-6	-5	-4	-5	-6	-2	3	4	-1	-4	2	5	3			
10000	-18	-12	-11	-6	-5	-4	-5	-7	-3	2	4	-0	-3	3	6	3			
OCTAVE																			
31.5	-9	-9	-8	-8	-7	-6	-5	-5	-4	-2	-1	-5	-5	3	7	8			
63	-13	-13	-12	-11	-11	-11	-11	-9	-9	-7	-3	-6	-4	5	9	7			
125	-13	-14	-13	-14	-14	-14	-15	-13	-12	-8	-4	-5	-2	7	8	5			
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8000	-17	-10	-9	-6	-5	-4	-5	-6	-2	3	4	-1	-4	2	5	3			
OVERALL	-8	-6	-5	-4	-5	-5	-7	-8	-6	-1	1	-2	-2	5	7	6			

FIGURE: OVERALL SOUND PRESSURE LEVEL (OASPL)	EQUAL LEVEL CONTOURS (DB)	NOISE SOURCE/SUBJECT:	OPERATION:	METEOROLOGY:	IDENTIFICATION:
4		A-7E AIRCRAFT	IDLE POWER	TEMP = 15 C	OMEGA 1.4
		TF-41 ENGINE	55% RPM	BAR PRESS = .760 M HG	TEST 75-002-005
		FAR FIELD NOISE	FREE FLOW	REL HUMID = 70 %	RUN 01
					06 MAY 75
					PAGE 13

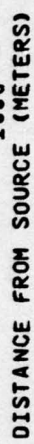
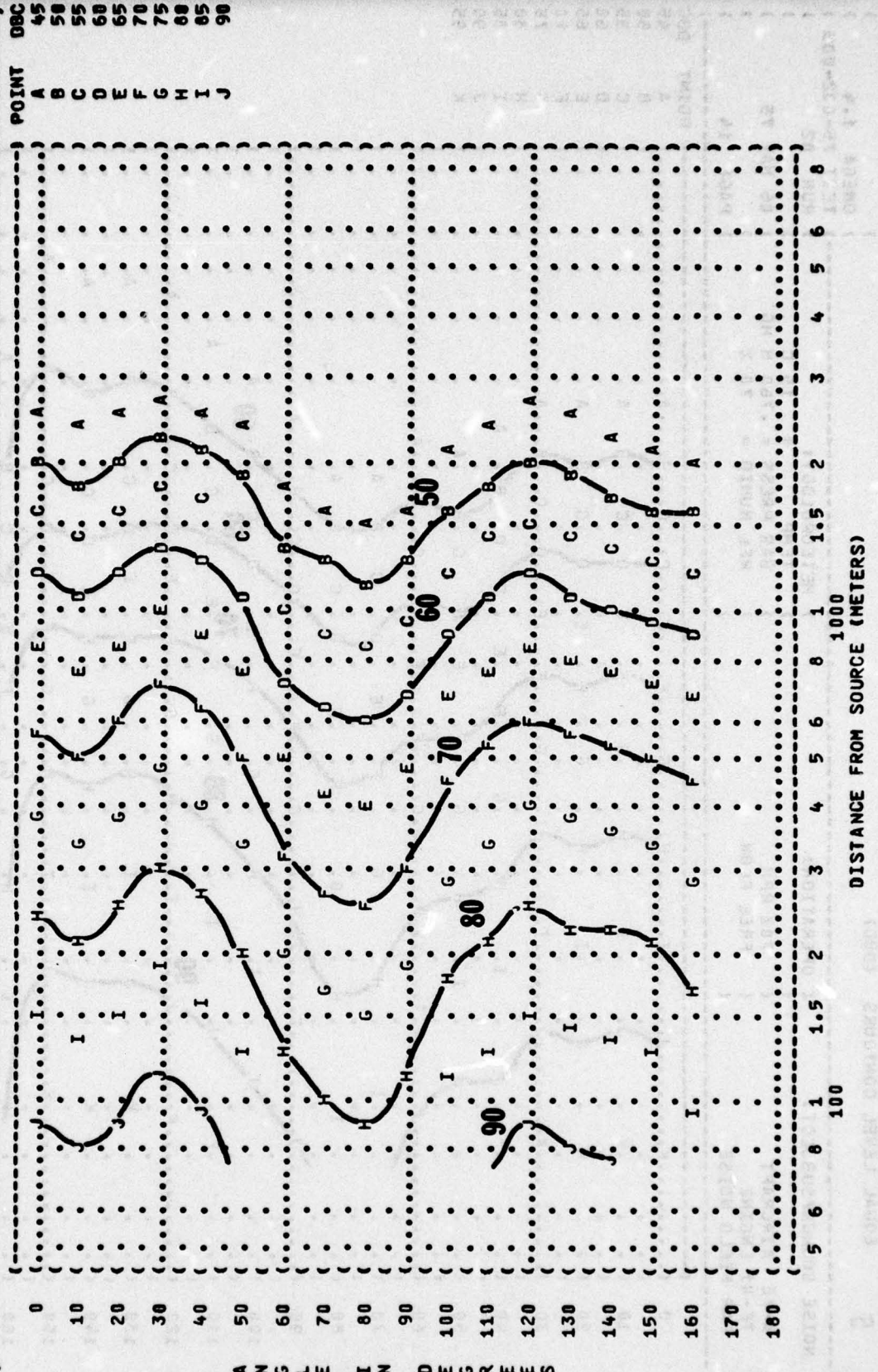


FIGURE: C-WEIGHTED OVERALL SOUND LEVEL (OASLC)
 5
 IDENTIFICATION: OMEGA 1.4
 TEST 75-002-005
 RUN 01
 METEOROLOGY: TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 OPERATION: A-7E AIRCRAFT
 IDLE POWER
 55% RPM
 FREE FLOW
 NOISE SOURCE/SUBJECT: A-7E AIRCRAFT
 IDLE POWER
 55% RPM
 FREE FLOW
 PAGE 14



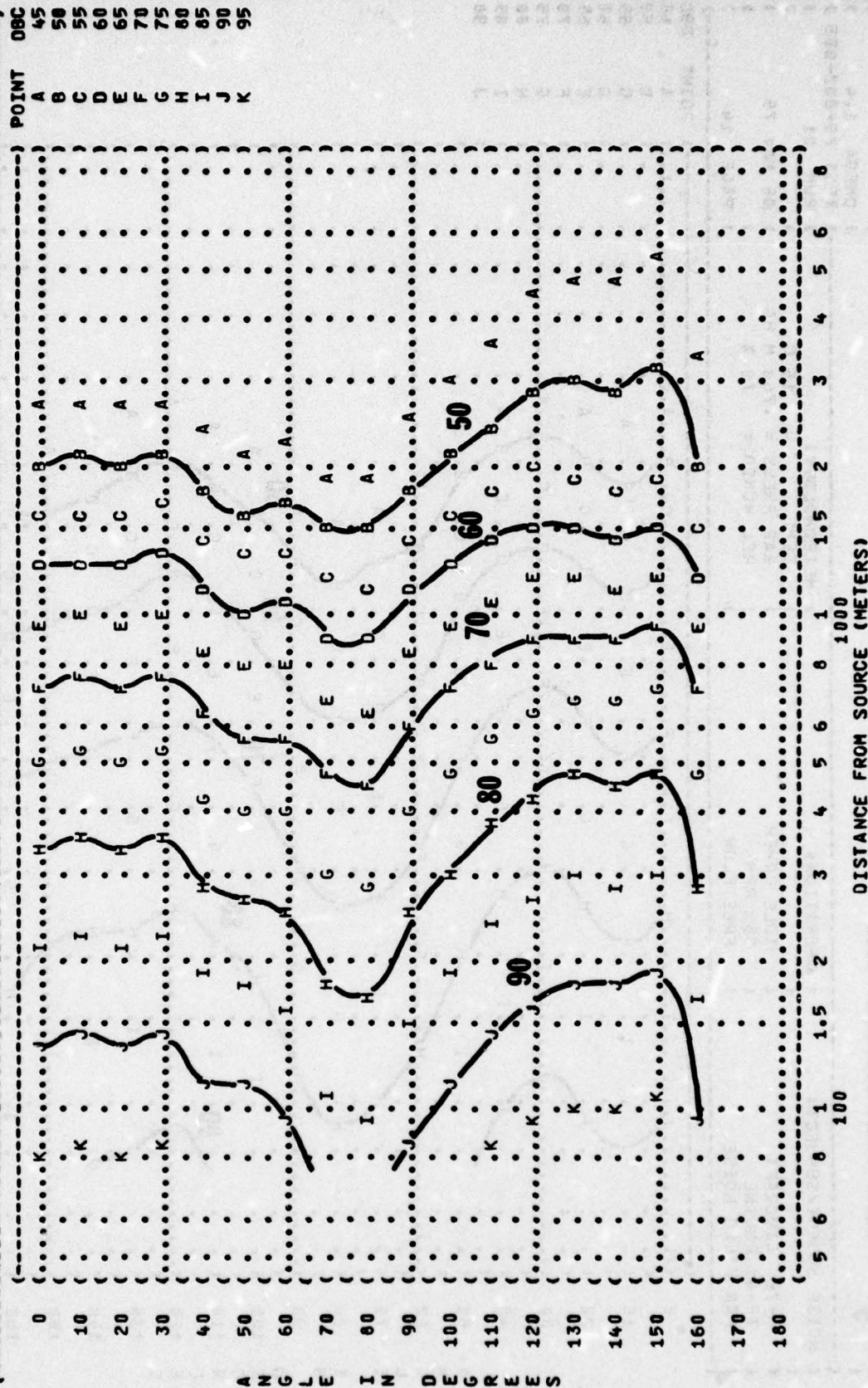
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EQUAL LEVEL CONTOURS

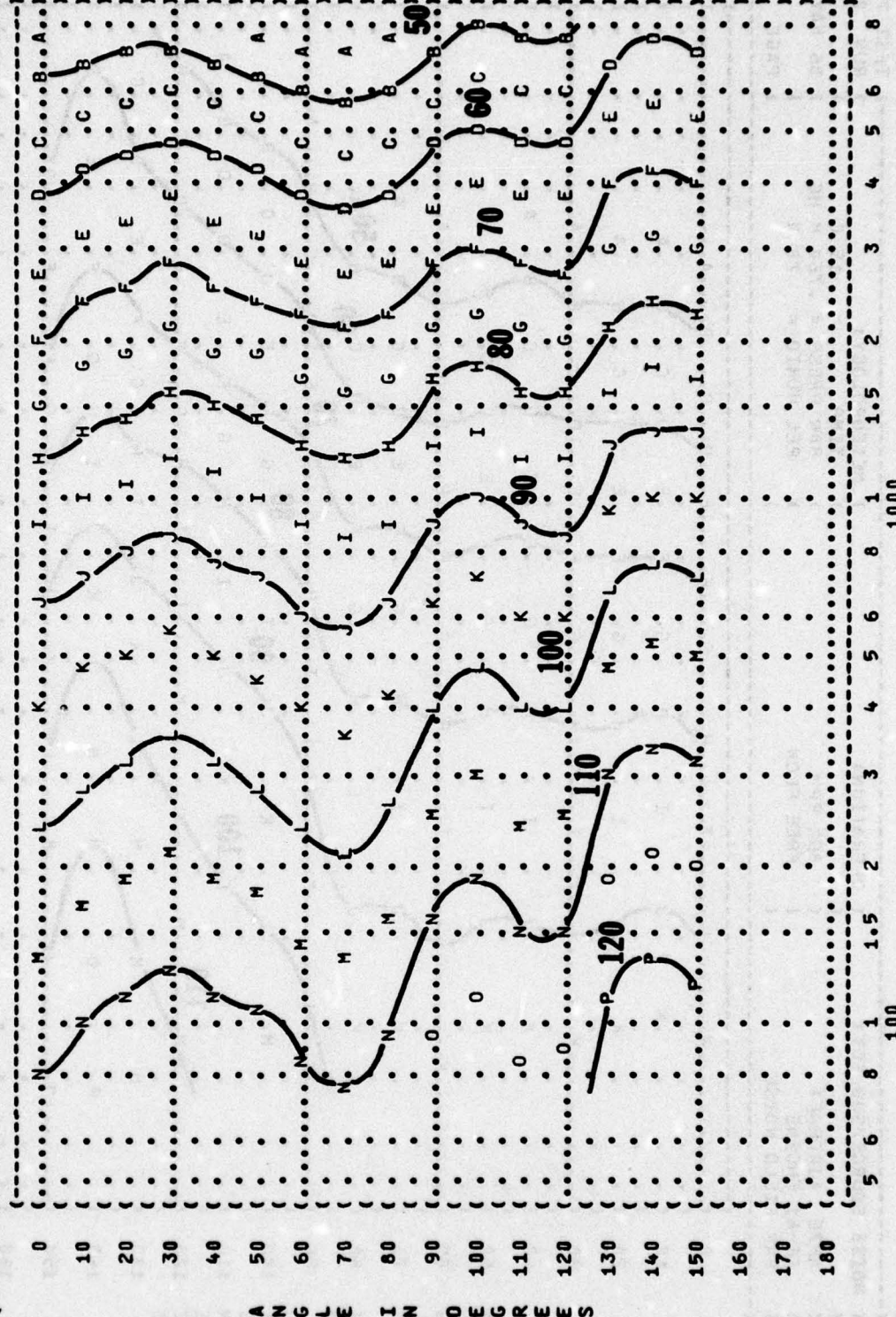
FIGURE: C-WEIGHTED OVERALL SOUND LEVEL (JASLC)
EQUAL LEVEL CONTOURS (D8C)

5

NOISE SOURCE/SUBJECT:	OPERATION:	METEOROLOGY:	IDENTIFICATION:
A-7E AIRCRAFT	(TEMP = 15 C	OMEGA 1.4
TF-41 ENGINE	(BAR PRESS = .760 M HG	TEST 75-002-00
FAR FIELD NOISE	(REL HUMID = 70 %	RUN 02
	(06 MAY 75
	(PAGE 14



IDENTIFICATION: OMEGA 1.4
 TEST 75-002-005
 RUN 04
 METEOROLOGY: TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 NOISE SOURCE/SUBJECT: OPERATION: A-7E AIRCRAFT
 TF-41 ENGINE MILITARY POWER
 FAR FIELD NOISE 94% RPM
 FREE FLOW



DISTANCE FROM SOURCE (METERS)

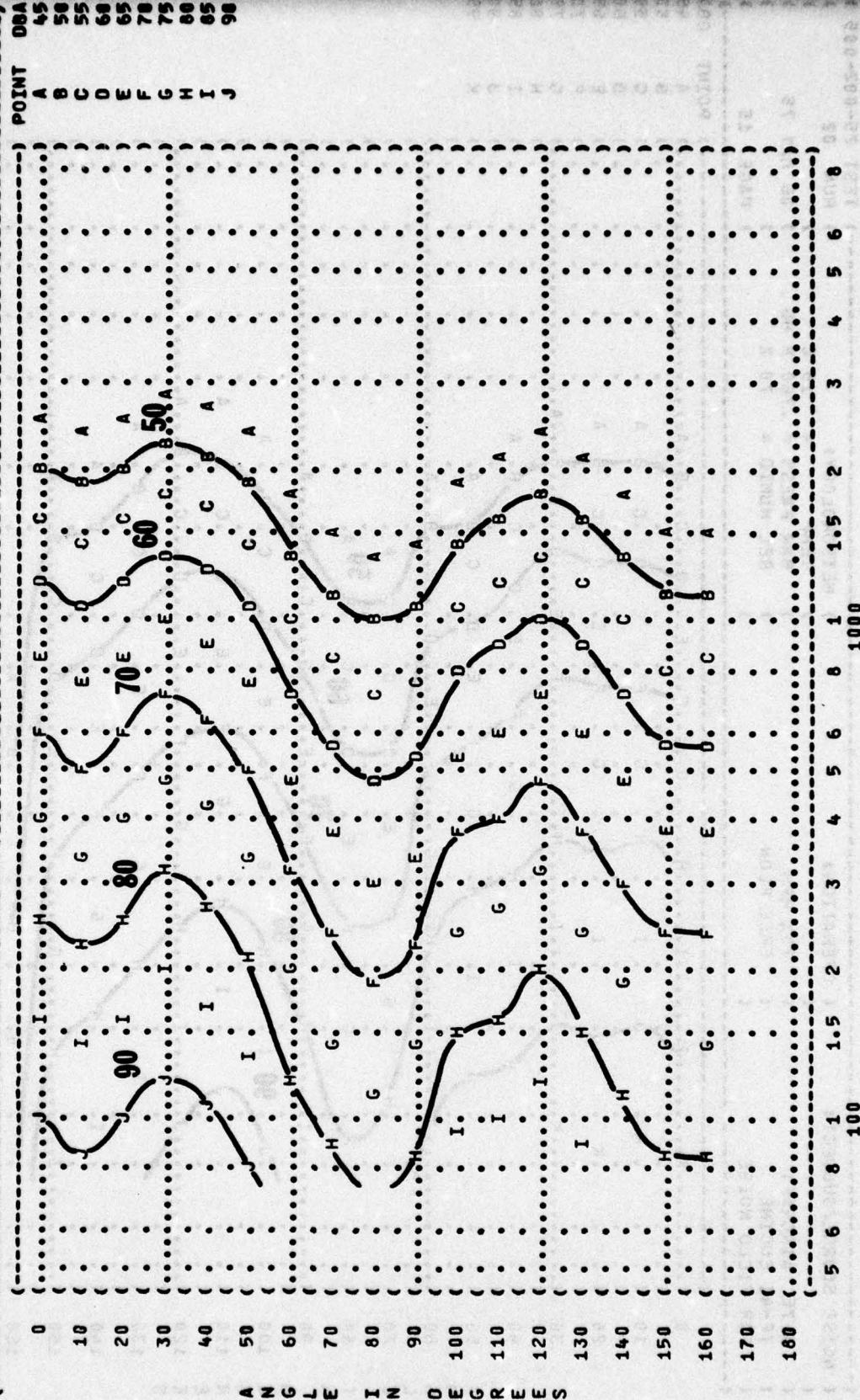
FIGURE 6 A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
EQUAL LEVEL CONTOURS (DBA)

IDENTIFICATION: OMEGA 1.4
TEST 75-002-005
RUN 01
06 MAY 75
PAGE 15

METEOROLOGY:
TEMP = 15 C
BAR PRESS = .760 M HG
REL HUMID = 70 %

OPERATION:
A-7E AIRCRAFT
IDLE POWER
55% RPM
FREE FLOW

NOISE SOURCE/SUBJECT:

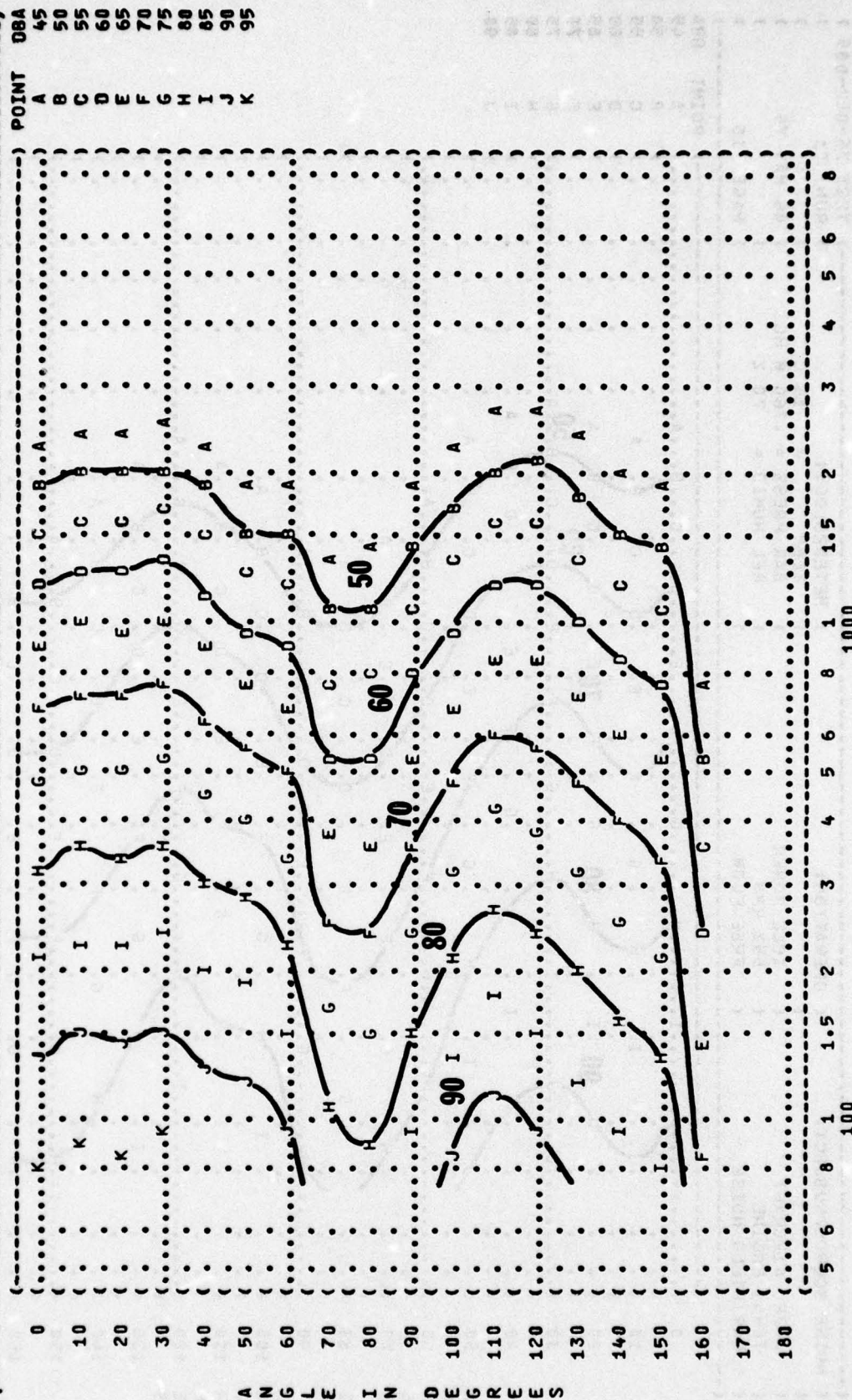


DISTANCE FROM SOURCE (METERS)

FIGURE: A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
 6
 EQUAL LEVEL CONTOURS (DBA)

NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 ((()
 (((70% RPM) TEMP = 15 C)
 (((FREE FLOW) BAR PRESS = .760 M HG)
 (((FAR FIELD NOISE) REL HUMID = 70 %)
 ((())
 ((()) PAGE 15)

IDENTIFICATION:)
)
) OMEGA 1.4
) TEST 75-002-005
) RUN 02
) 06 MAY 75
)
)



DISTANCE FROM SOURCE (METERS)

FIGURE: A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
 6
 IDENTIFICATION:
 NOISE SOURCE/SUBJECT: (OPERATION:)
 A-7E AIRCRAFT (MILITARY POWER)
 TF-41 ENGINE (94% RPM)
 FAR FIELD NOISE (FREE FLOW)
 METEOROLOGY:
 TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 OMEGA 1.4
 TEST 75-002-005
 RUN 04
 06 MAY 75
 PAGE 15

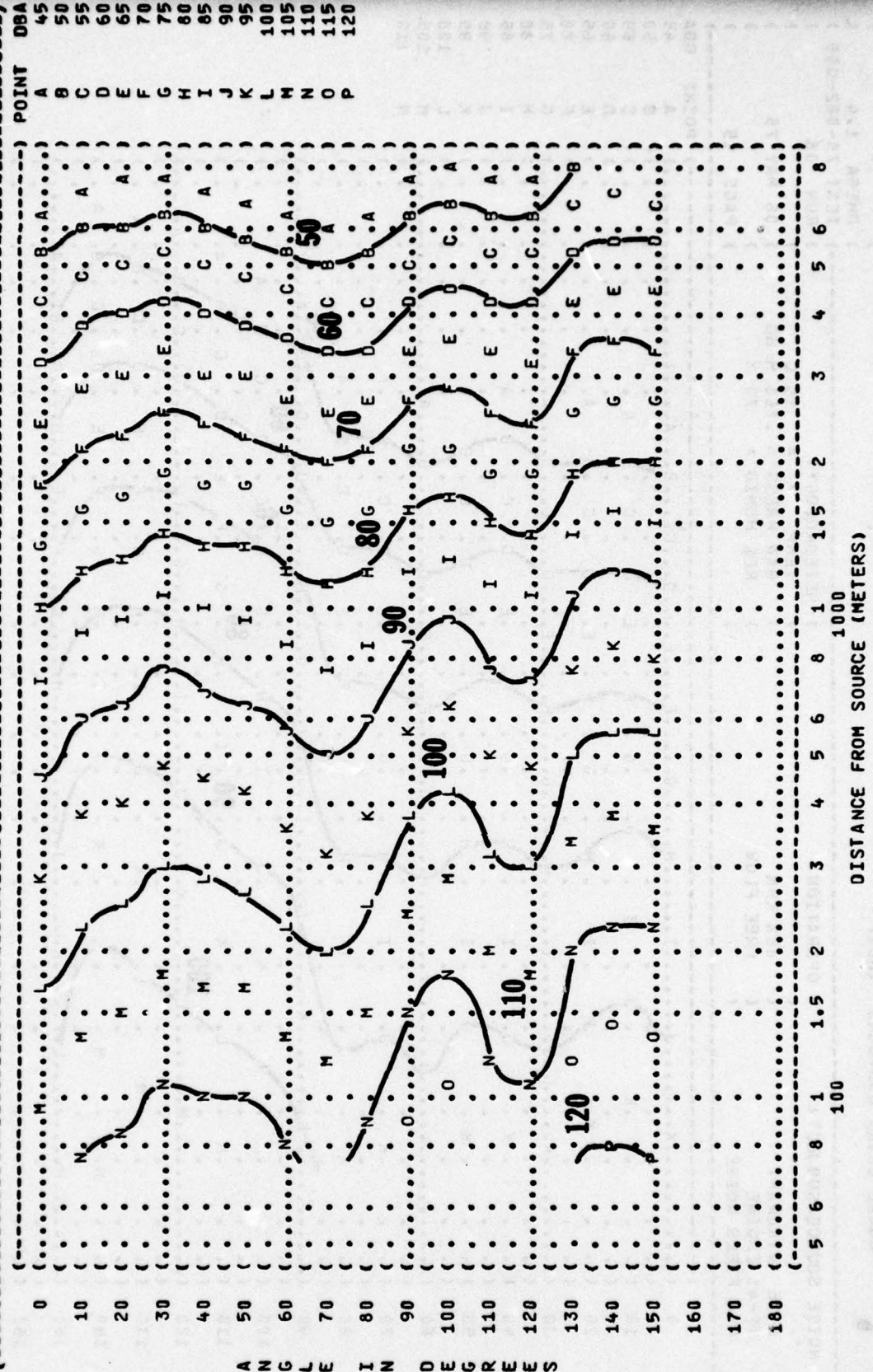
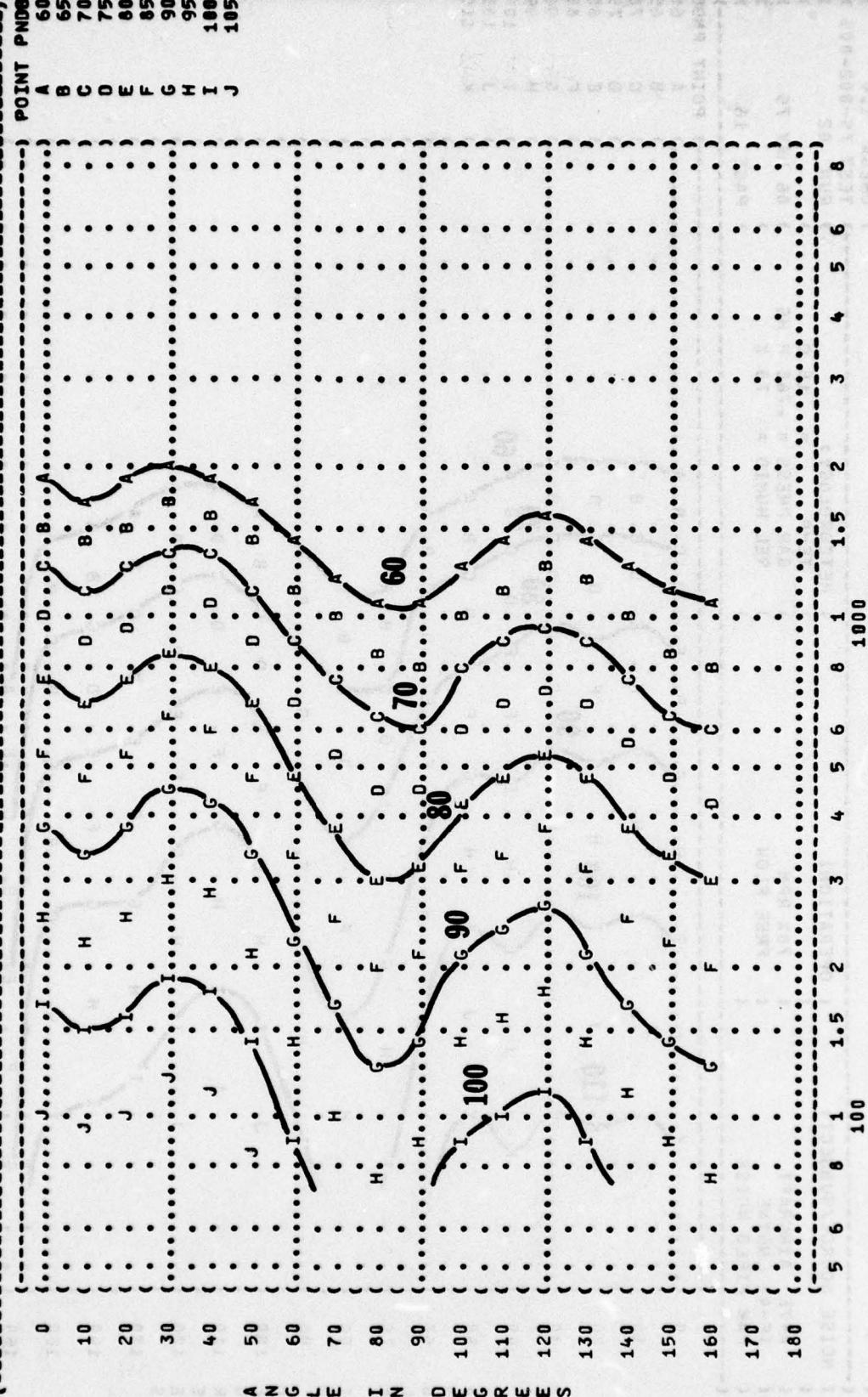
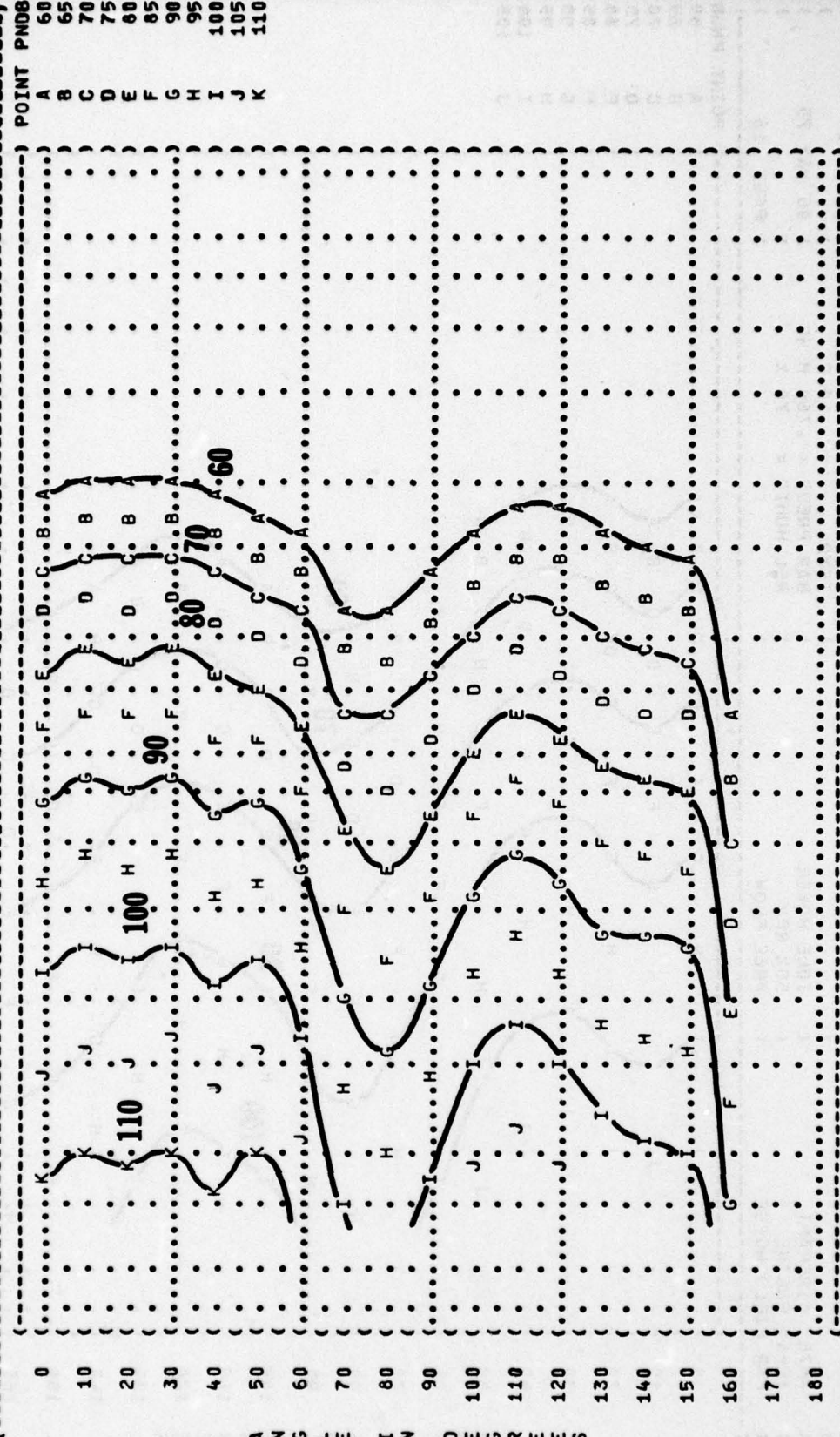


FIGURE: PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT)
 7
 IDENTIFICATION: OMEGA 1.4
 TEST 75-002-005
 RUN 01
 METEOROLOGY: TEMP = 15 C
 BAR PRESS = .760 H HG
 REL HUMID = 70 %
 NOISE SOURCE/SUBJECT: OPERATION: A-7E AIRCRAFT IDLE POWER
 TF-41 ENGINE 55% RPM
 FAR FIELD NOISE FREE FLOW
 06 MAY 75
 PAGE 16



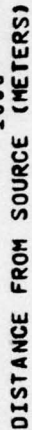
A N G L E I N D E G R E E S

FIGURE: PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT)
 7
 IDENTIFICATION:
 OMEGA 1.4
 TEST 75-002-005
 RUN 02
 NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:
 A-7E AIRCRAFT (70% RPM) TEMP = 15 C
 TF-41 ENGINE (FREE FLOW) BAR PRESS = .760 M HG
 FAR FIELD NOISE () REL HUMID = 70 %
 PAGE 16



A N G L E I N D E G R E E S

06 MAY 75
PAGE 16



PAGE 16

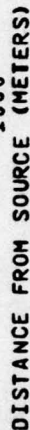


FIGURE 1: PREFERRED SPEECH INTERFERENCE LEVEL (PSIL)
EQUAL LEVEL CONTOURS (DB)

8

NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 ((()
 (A-7E AIRCRAFT (70% RPM) TEMP = 15 C)
 (TF-41 ENGINE (FREE FLOW) BAR PRESS = .760 M HG)
 (FAR FIELD NOISE () REL HUMID = 70 %)

IDENTIFICATIONS:
)
) OMEGA 1.4
) TEST 75-002-005
) RUN 02
) 06 MAY 75
) PAGE 17

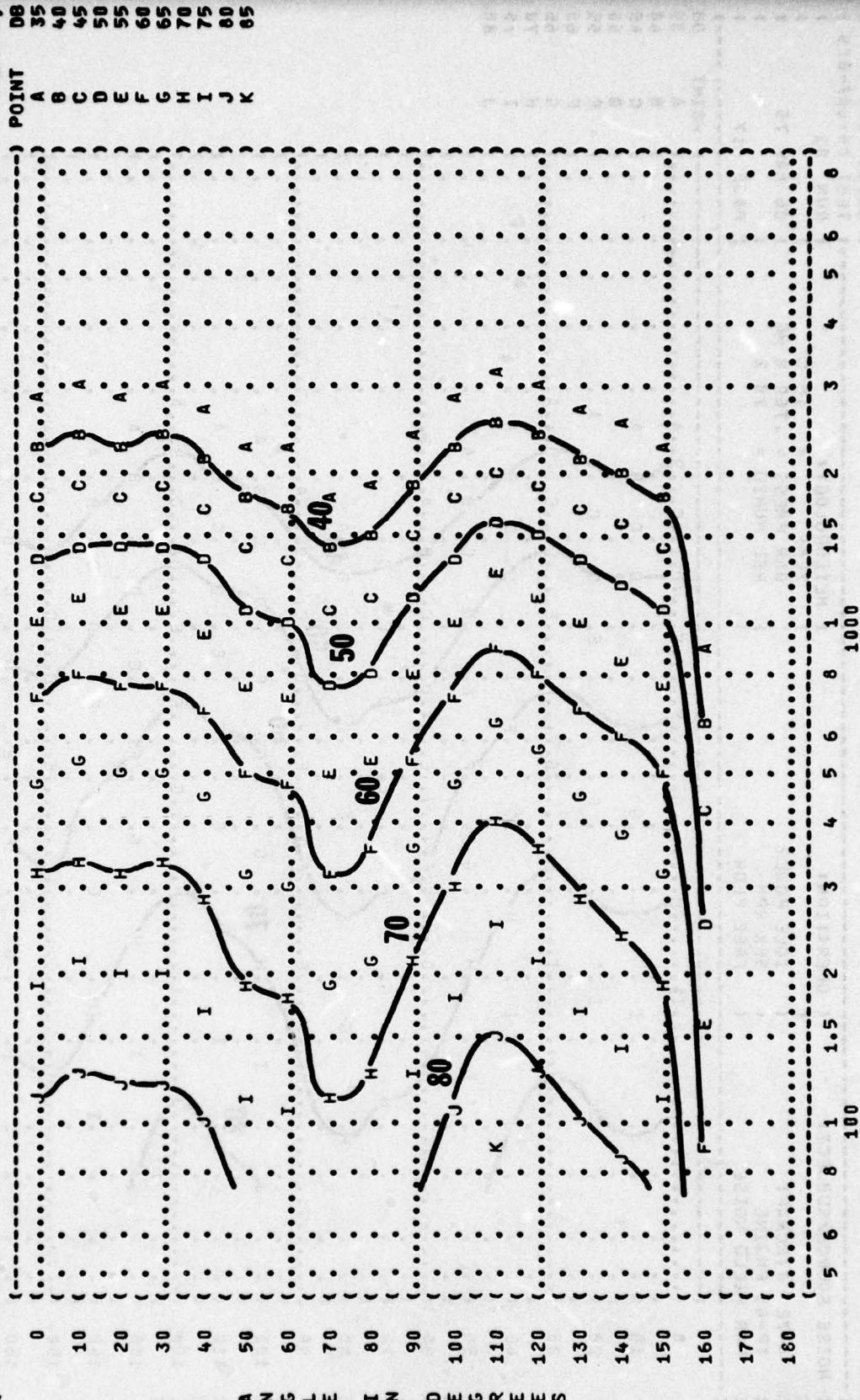


FIGURE: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)

9

IDENTIFICATION: OMEGA 1.4

TEST 75-002-005

RUN 01

06 MAY 75

PAGE 8

NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)

A-7E AIRCRAFT (IDLE POWER) TEMP = 15 C

TF-41 ENGINE (55% RPM) BAR PRESS = .760 M HG

FAR FIELD NOISE (FREE FLOW) REL HUMID = 70 %

0<	1	1.5	2	3	4	5	6	8	100	1000	10000
10<	1	1.5	2	3	4	5	6	8	100	1000	10000
20<	1	1.5	2	3	4	5	6	8	100	1000	10000
30<	1	1.5	2	3	4	5	6	8	100	1000	10000
40<	1	1.5	2	3	4	5	6	8	100	1000	10000
50<	1	1.5	2	3	4	5	6	8	100	1000	10000
60<	1	1.5	2	3	4	5	6	8	100	1000	10000
70<	1	1.5	2	3	4	5	6	8	100	1000	10000
80<	1	1.5	2	3	4	5	6	8	100	1000	10000
90<	1	1.5	2	3	4	5	6	8	100	1000	10000
100<	1	1.5	2	3	4	5	6	8	100	1000	10000
110<	1	1.5	2	3	4	5	6	8	100	1000	10000
120<	1	1.5	2	3	4	5	6	8	100	1000	10000
130<	1	1.5	2	3	4	5	6	8	100	1000	10000
140<	1	1.5	2	3	4	5	6	8	100	1000	10000
150<	1	1.5	2	3	4	5	6	8	100	1000	10000
160<	1	1.5	2	3	4	5	6	8	100	1000	10000
170	1	1.5	2	3	4	5	6	8	100	1000	10000
180	1	1.5	2	3	4	5	6	8	100	1000	10000

PERSONNEL MAY BE EXPOSED UP TO 960 MINUTES PER DAY

AT ALL DISTANCES FROM SOURCE EQUAL TO OR GREATER THAN 75 METERS

FOR ALL ANGLES EVALUATED (INDICATED BY < AT LEFT)

UNDER THE FOLLOWING EAR PROTECTION CONDITIONS:

MINIMUM QPL EAR MUFFS

AMERICAN OPTICAL 1700 EAR MUFFS

V-51R EAR PLUGS

COMFIT TRIPLE FLANGE EAR PLUGS

H-133 GROUND COMMUNICATION UNIT

A
N
G
L
E

I
N

D
E
G
R
E
E
S

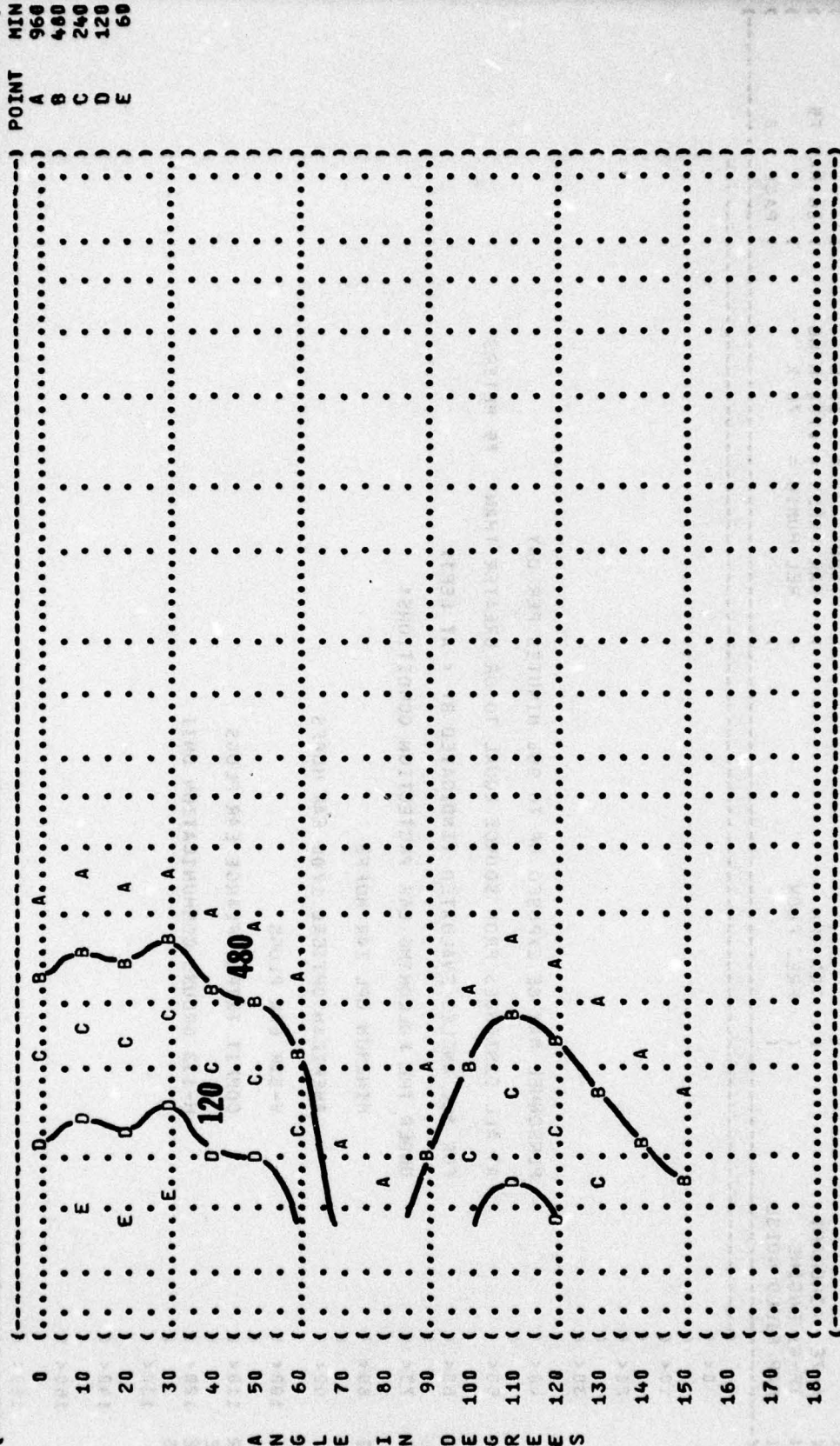
DISTANCE FROM SOURCE (METERS)

FIGURE 1 MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)

9
EQUATION: $T = \frac{100}{N}$
NO PROTECTION

NOISE SOURCE/SUBJECT: () OPERATION: () METEOROLOGY: ()
 () A-7E AIRCRAFT () 70% RPM () TEMP = 15 C
 () TF-41 ENGINE () FREE FLOW () BAR PRESS = .760 M HG
 () FAR FIELD NOISE () () REL HUMID = 70 %

IDENTIFICATION: () OMEGA 1.4
 TEST 75-002-005
 RUN 02
 06 MAY 75
 PAGE 7



PERSONNEL MAY BE EXPOSED UP TO 960 MINUTES PER DAY
AT ALL DISTANCES FROM SOURCE EQUAL TO OR GREATER THAN 75 METERS
FOR ALL ANGLES EVALUATED (INDICATED BY < AT LEFT)
UNDER THE FOLLOWING EAR PROTECTION CONDITIONS:

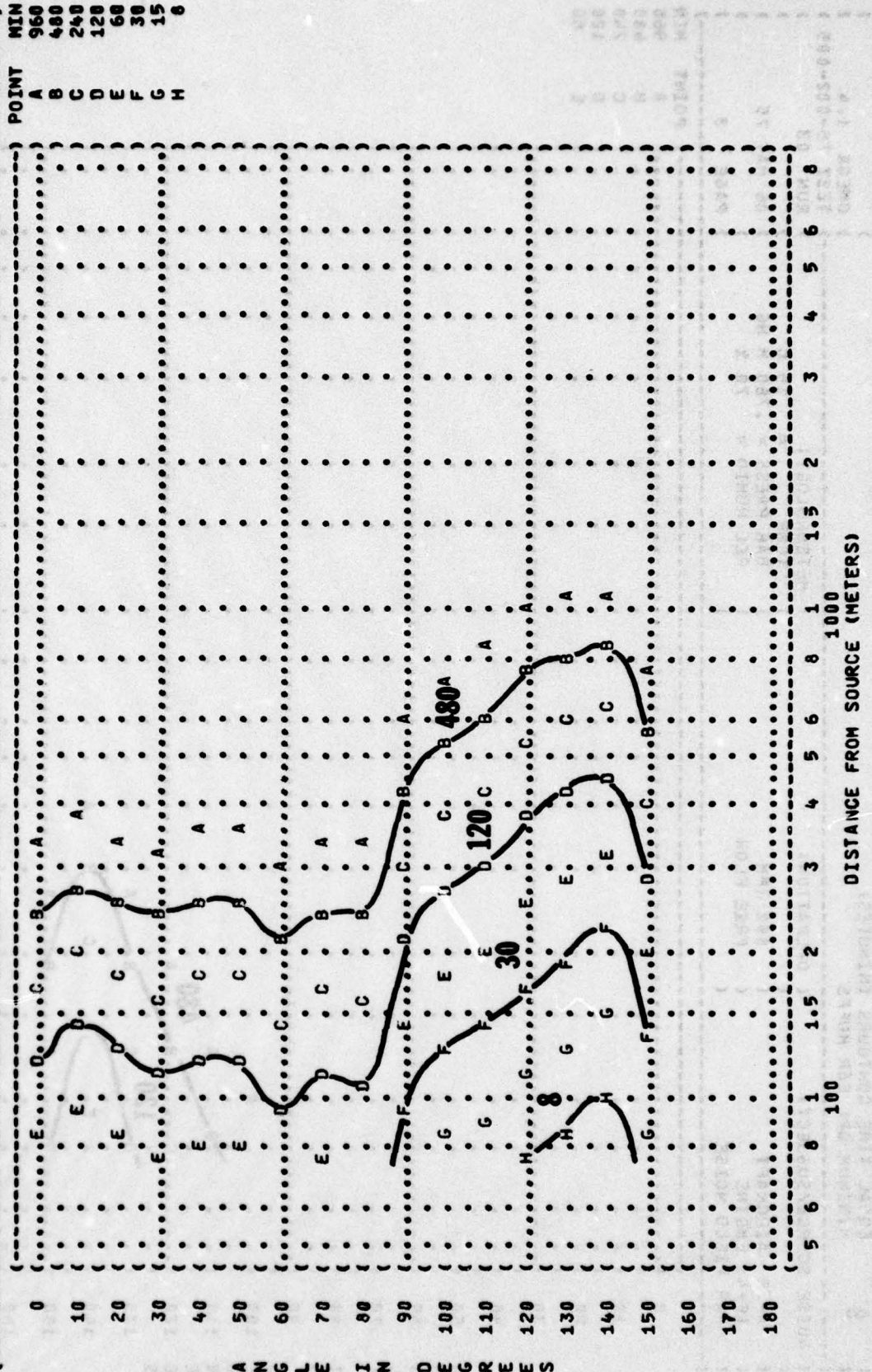
MINIMUM QPL EAR MUFFS
AMERICAN OPTICAL 1700 EAR MUFFS
V-51R EAR PLUGS
COMFIT TRIPLE FLANGE EAR PLUGS
H-133 GROUND COMMUNICATION UNIT

H-133 GROUND COMMUNICATION UNIT

5 6 8 1 1.5 2 3 4 5 6 8 1000 100

DISTANCE FROM SOURCE (METERS)

```
( ( FIGURE: MAXIMUM PERMISSIBLE TIME {T} FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) ) IDENTIFICATION: )
( ( EQUAL TIME CONTOURS (MINUTES) ) ) )
( ( 9 NO PROTECTION ) ) OMEGA 1.4
( ( ) ) TEST 75-002-005
( ( NOISE SOURCE/SUBJECT: ) OPERATION: ) METEOROLOGY: ) RUN 03
( ( ) ) TEMP = 15 C ) )
( ( A-7E AIRCRAFT ) 85% RPM ) BAR PRESS = .760 M HG ) )
( ( TF-41 ENGINE ) FREE FLOW ) REL HUMID = 70 % ) )
( ( FAR FIELD NOISE ) ) PAGE 7 )
```



	MIN	POINT
0	960	A
10	480	B
20	240	C
	120	D
	60	E

30 ()

40 ()

.....

5

22

100

50

.....

.....

480

120

[illegible]

.....

.....

.....

.....

1000
100

ANGLE OF INCIDENCE

ANGLE OF REFLECTION

A. 480

B. 480

FIGURE 8 MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
0 EQUAL TIME CONTOURS (MINUTES)

FIGURE: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
 9
 EQUAL TIME CONTOURS (MINUTES)
 MINIMUM QPL EAR MUFFS

IDENTIFICATION:
)
) OMEGA 1.4
)

NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:) RUN 04)
((MILITARY POWER) TEMP = 15 C))
((94% RPM) BAR PRESS = .760 M HG)) 06 MAY 75)
((FREE FLOW) REL HUMID = 70 %))
A-7E AIRCRAFT
TF-41 ENGINE
FAR FIELD NOISE

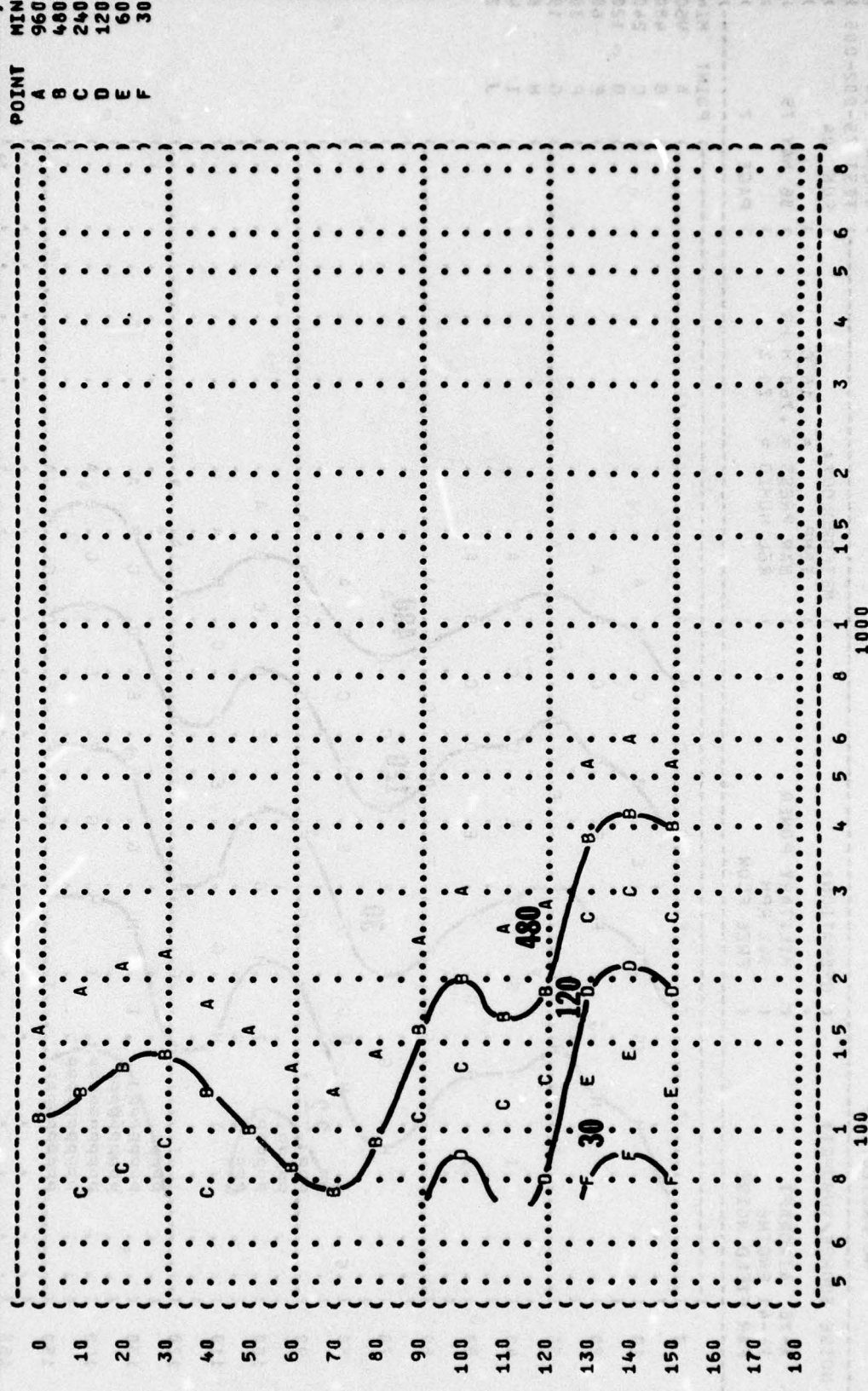
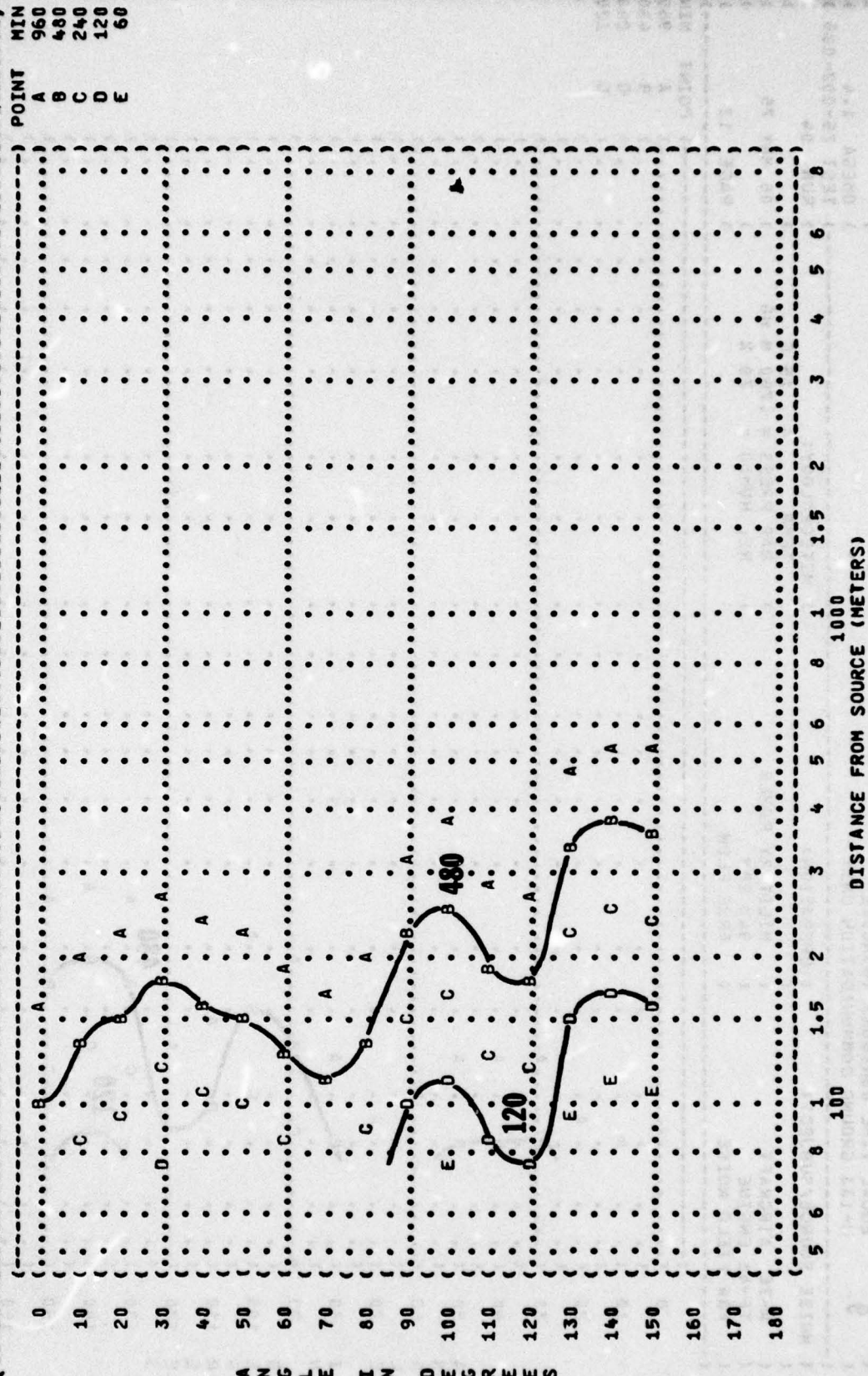
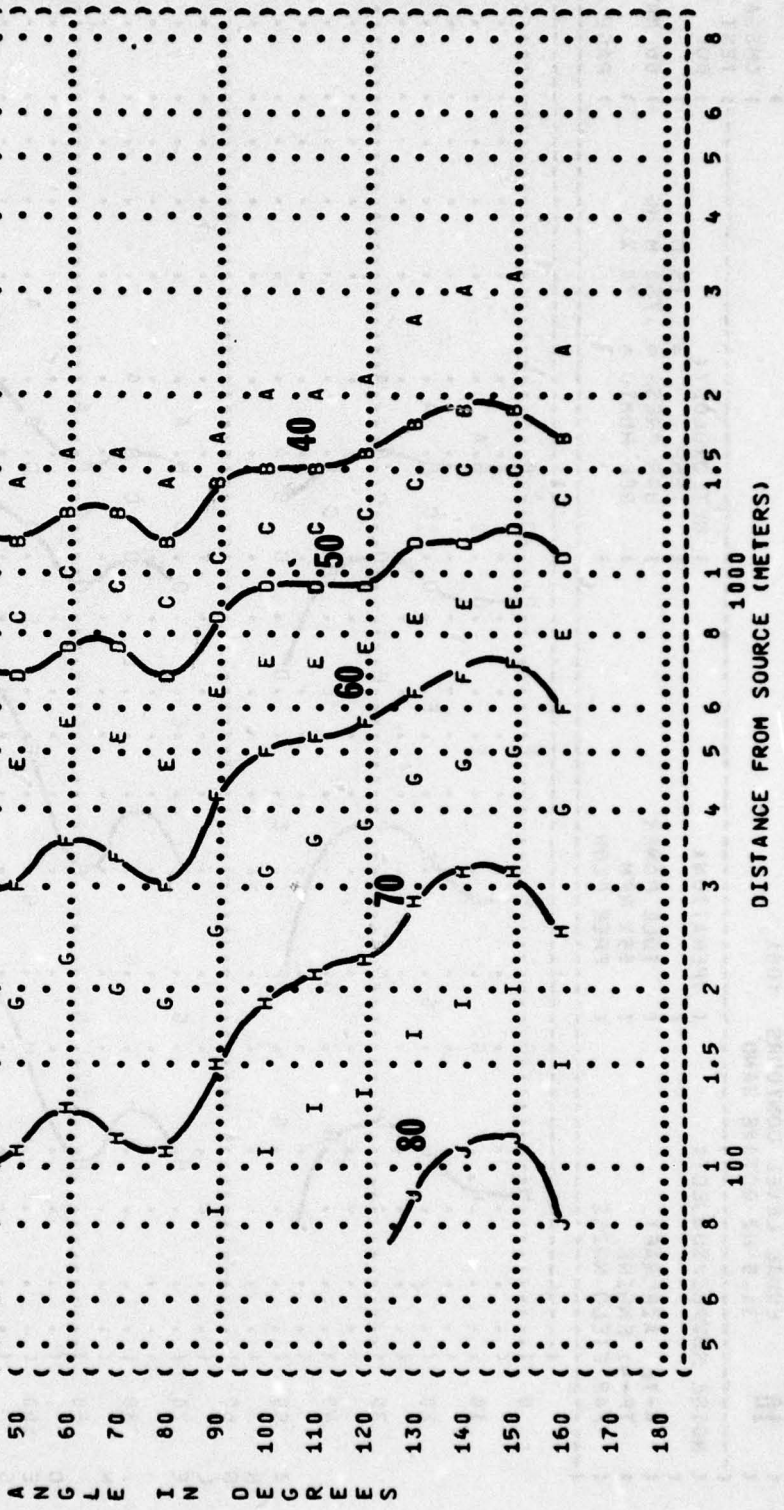


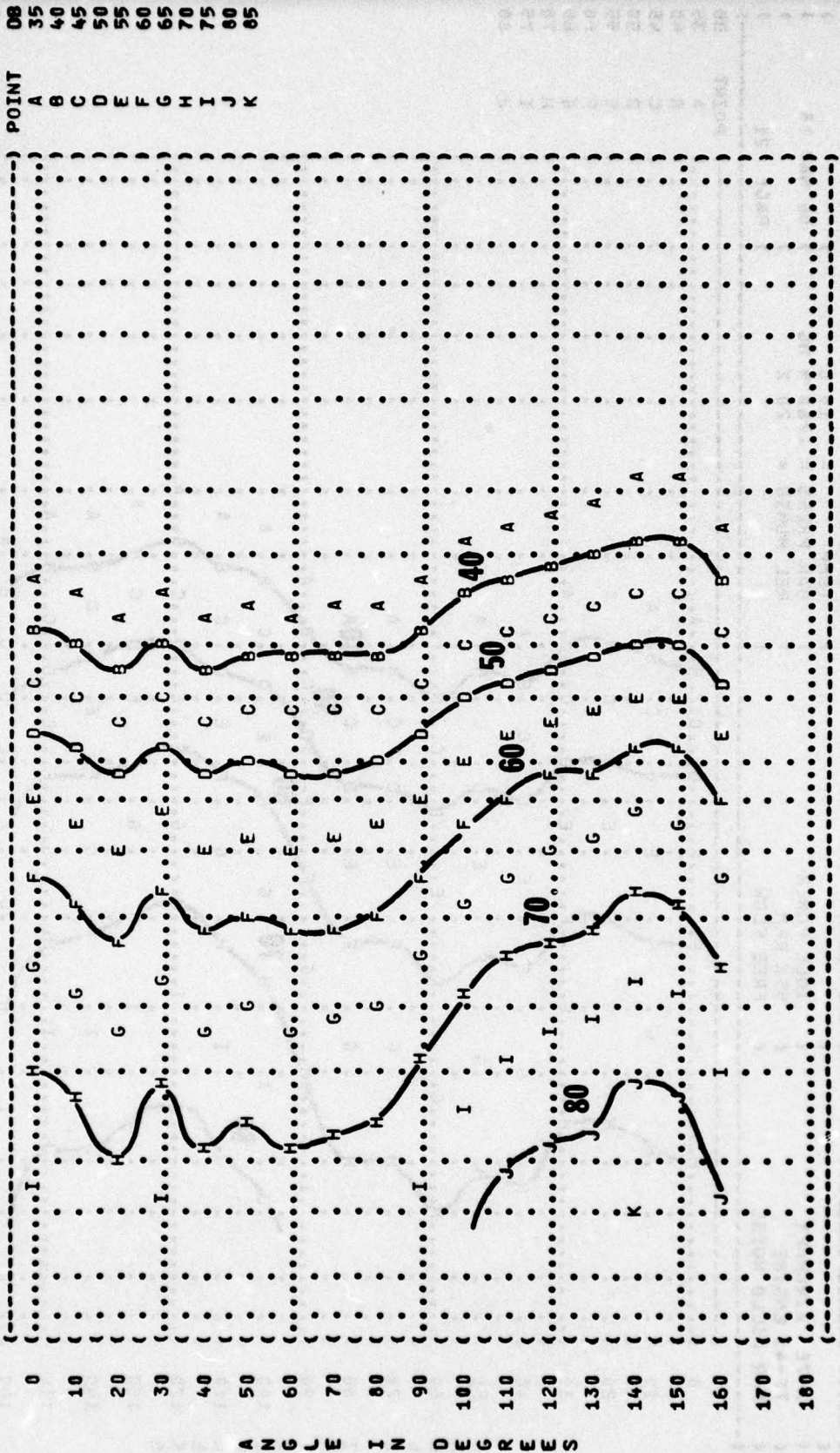
FIGURE:	MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)	IDENTIFICATION:
9	EQUAL TIME CONTOURS (MINUTES)	
	COMFIT TRIPLE FLANGE EAR PLUGS	OMEGA 1.4
		TEST 75-002-005
NOISE SOURCE/SUBJECT:	(OPERATION:	RUN 04
	(
A-7E AIRCRAFT	(MILITARY POWER	TEMP = 15 C
TF-41 ENGINE	(94% RPM	BAR PRESS = .760 M HG
FAR FIELD NOISE	(FREE FLOW	REL HUMID = 70 %
		PAGE 11



((FIGURE: SOUND PRESSURE LEVEL {SPL}
 ((10 EQUAL LEVEL CONTOURS (DB)
 ((63 HZ OCTAVE BAND
 ((NOISE SOURCE/SUBJECT: (OPERATION:
 ((A-7E AIRCRAFT ((IDLE POWER
 ((TF-41 ENGINE ((55% RPM
 ((FAR FIELD NOISE ((FREE FLOW
 ((METEOROLOGY:
 ((TEMP = 15 C
 ((BAR PRESS = .760 M HG
 ((REL HUMID = 70 %
 ((IDENTIFICATION:
 ((OMEGA 1.4
 ((TEST 75-002-005
 ((RUN 01
 ((06 MAY 75
 ((PAGE 19
 ((POINT DB
 ((A 35
 ((B 40
 ((C 45
 ((D 50
 ((E 55
 ((F 60
 ((G 65
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 ((I 75
 ((J 80

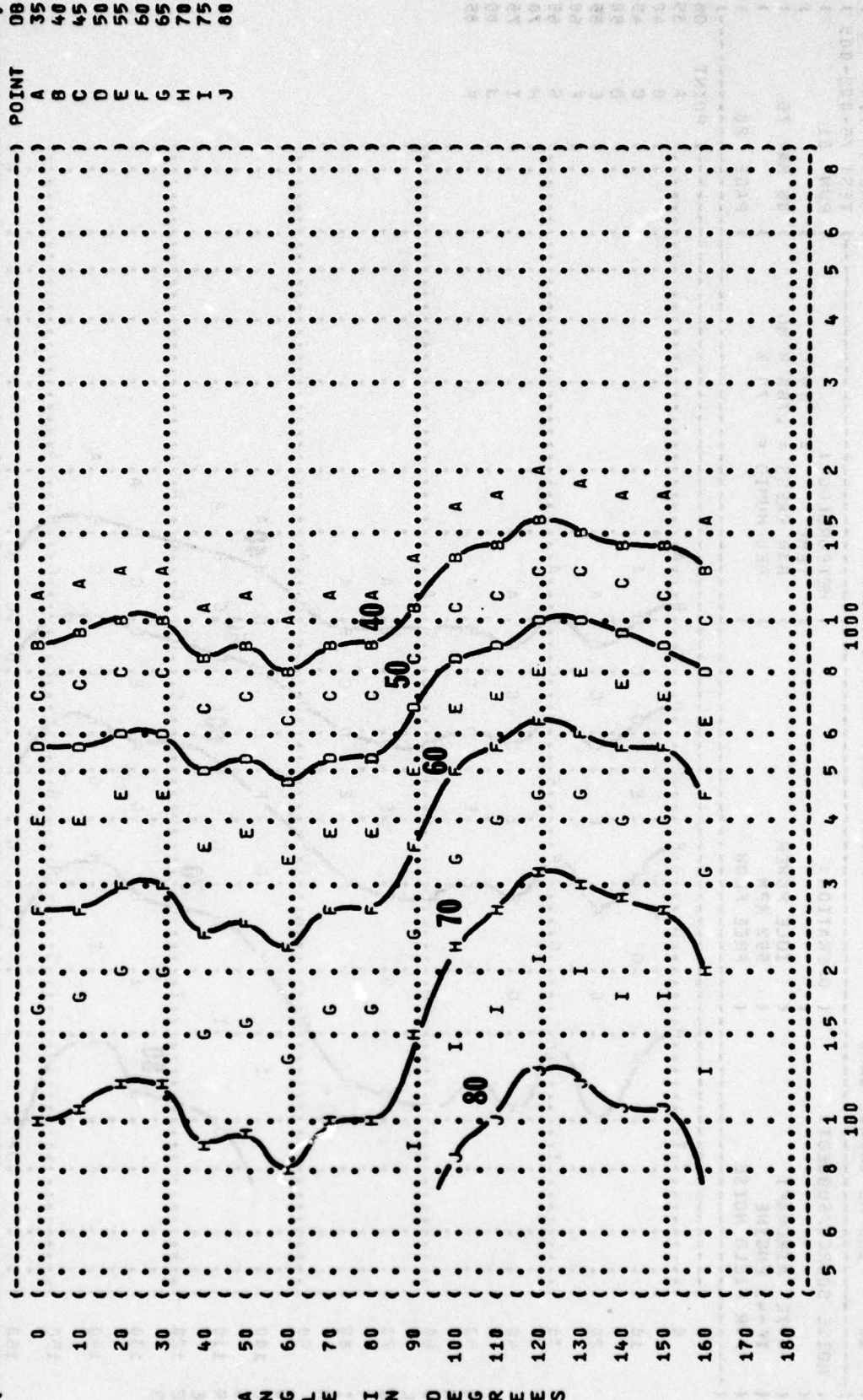


((FIGURE: SOUND PRESSURE LEVEL (SPL)
 ((EQUAL LEVEL CONTOURS (DB)
 ((10 125 HZ OCTAVE BAND
 ((NOISE SOURCE/SUBJECT: (OPERATION:
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 ((TF-41 ENGINE (55% RPM
 ((FAR FIELD NOISE (FREE FLOW
 ((METEOROLOGY:
 ((TEMP = 15 C
 ((BAR PRESS = .760 M HG
 ((REL HUMID = 70 %
 ((IDENTIFICATION:
 ((OMEGA 1.4
 ((TEST 75-002-005
 ((RUN 01
 ((06 MAY 75
 ((PAGE 20



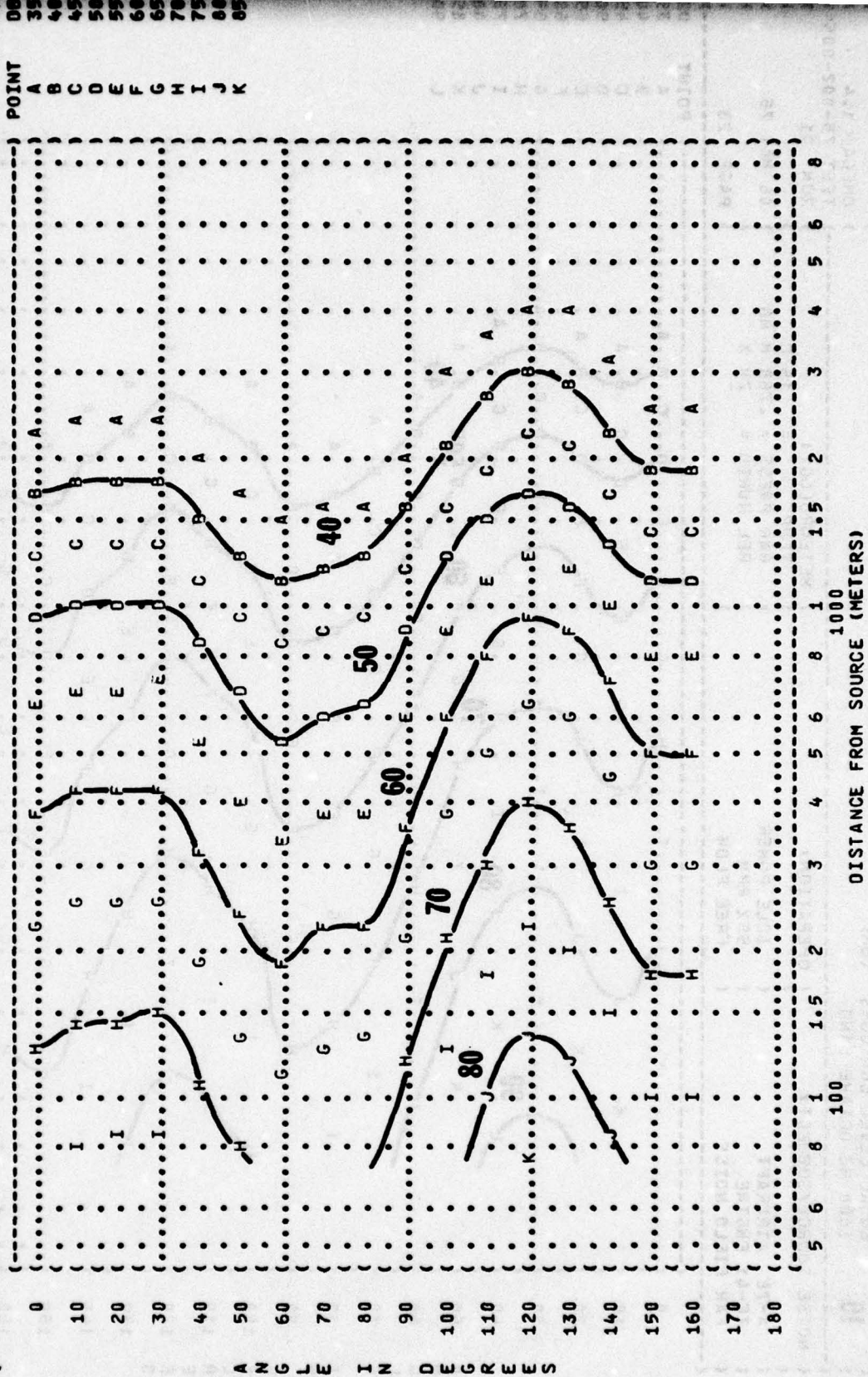
A N G L E I N D E G R E E S

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 (REL HUMID = 70 %
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 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 01



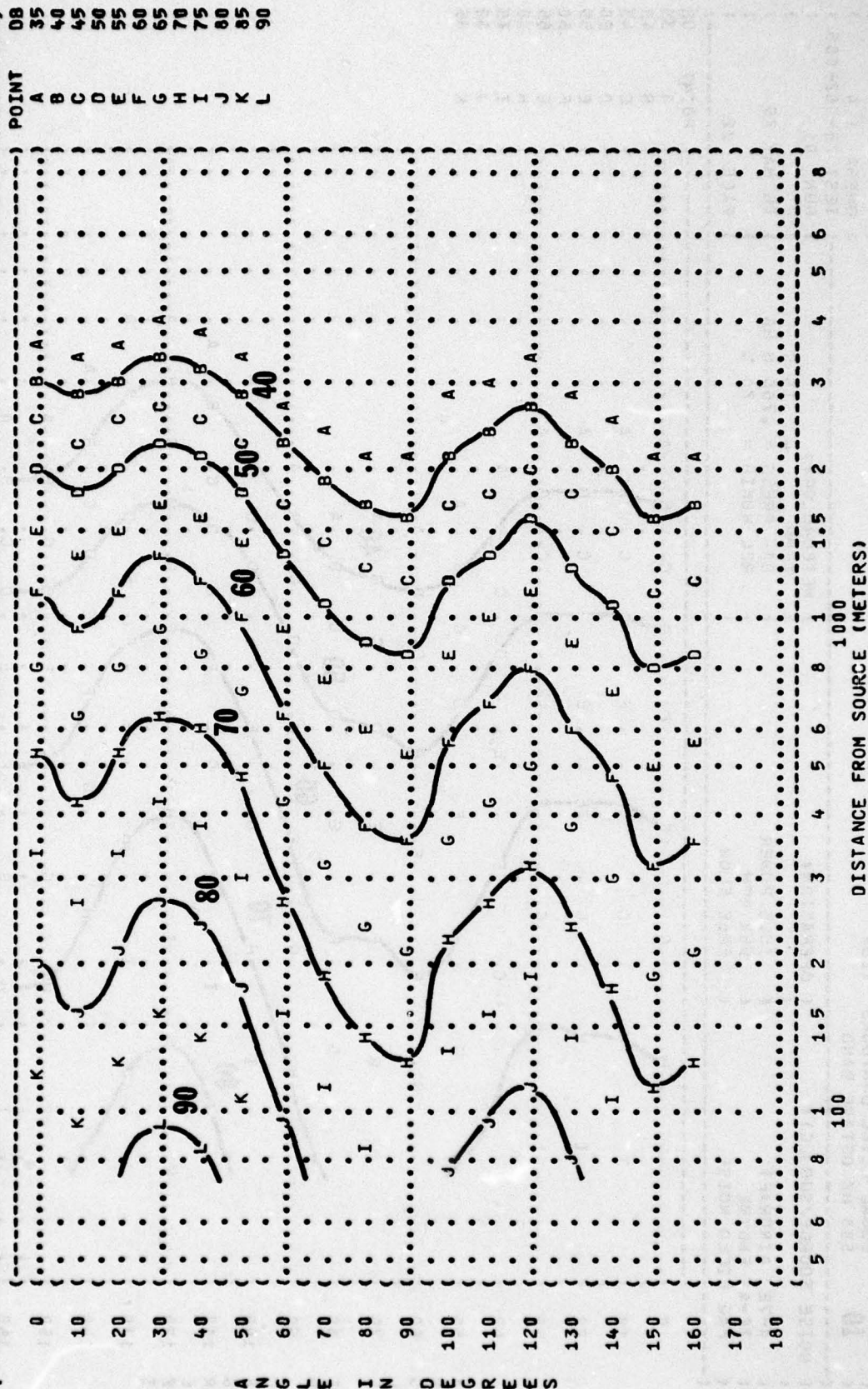
DISTANCE FROM SOURCE (METERS)

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 (10 500 HZ OCTAVE BAND
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 (TF-41 ENGINE (55% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
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 (TEST 75-002-005
 (RUN 01
 (06 MAY 75
 (PAGE 22

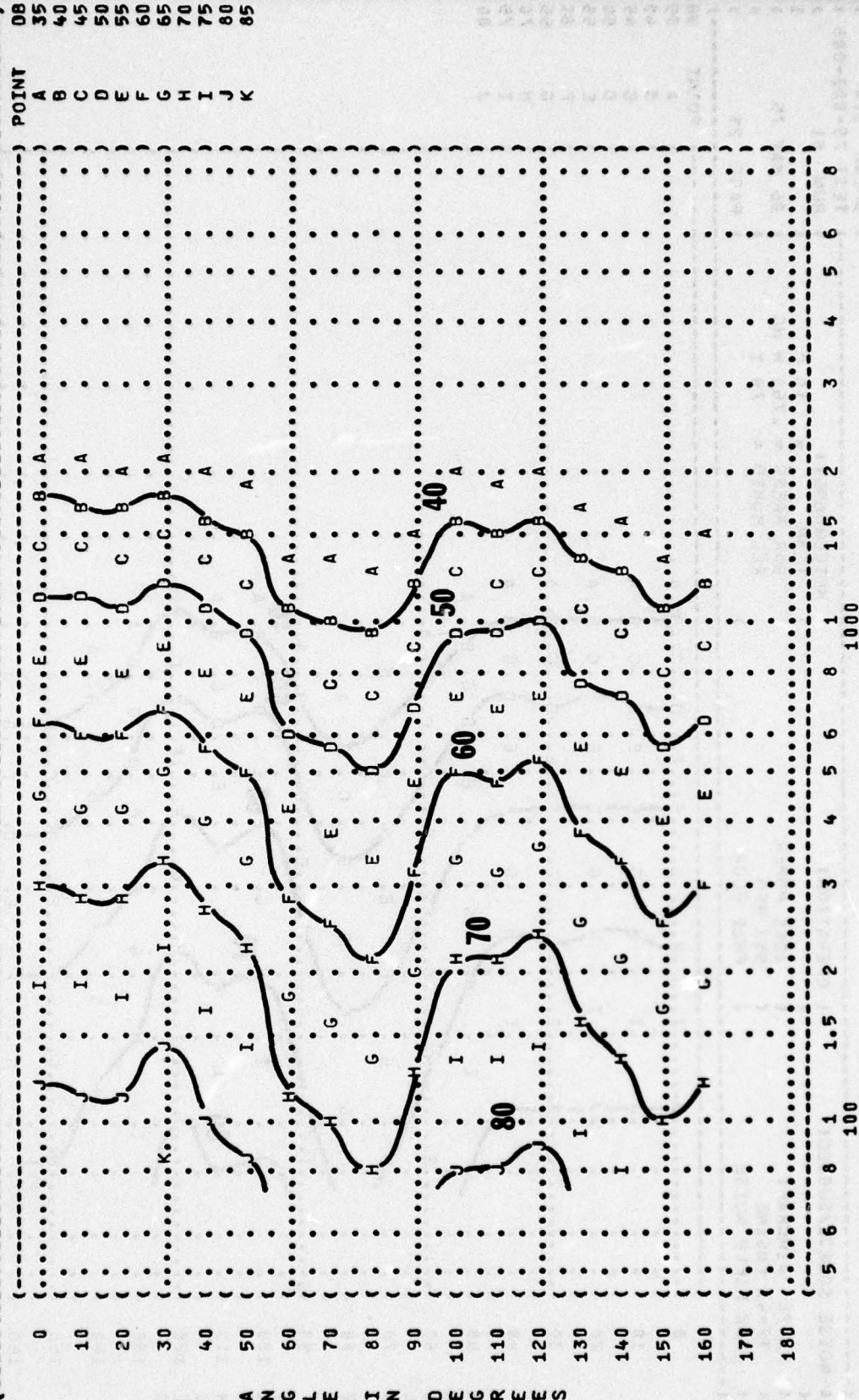


DISTANCE FROM SOURCE (METERS)

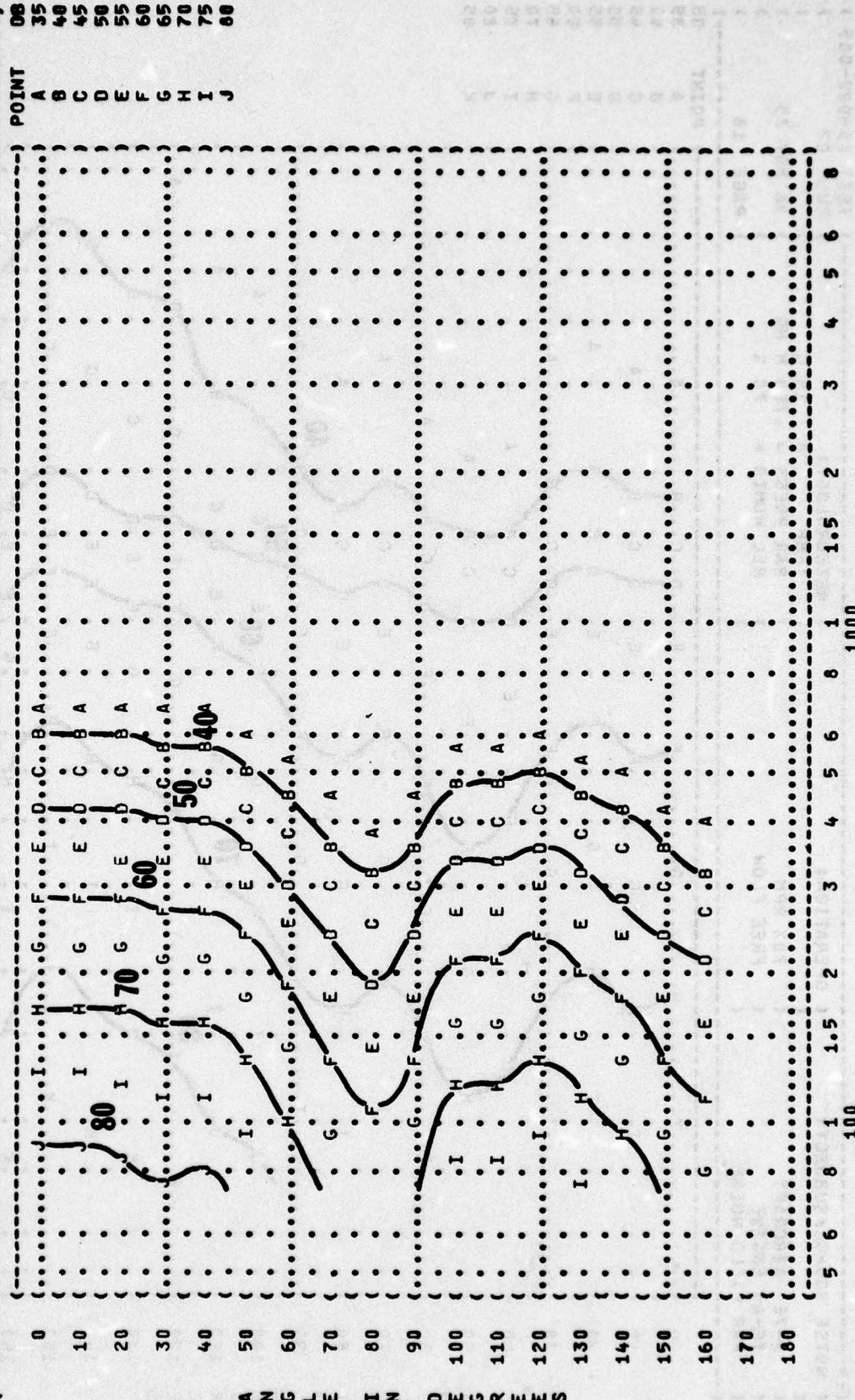
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 (EQUAL LEVEL CONTOURS (DB)
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 (TF-41 ENGINE (55% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 01
 (06 MAY 75
 (PAGE 23



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (EQUAL LEVEL CONTOURS (DB)
 (10 2000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (A-7E AIRCRAFT (IDLE POWER
 (TF-41 ENGINE (55% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY: TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (PAGE 24
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 01
 (06 MAY 75
 ()



(FIGURE: SOUND PRESSURE LEVEL (SPL)) IDENTIFICATION:)
 (10 EQUAL LEVEL CONTOURS (DB)) OMEGA 1.4)
 (8000 HZ OCTAVE BAND) TEST 75-002-005)
 (NOISE SOURCE/SUBJECT:) OPERATION:) METEOROLOGY:)
 (A-7E AIRCRAFT) (IDLE POWER) TEMP = 15 C)
 (TF-41 ENGINE) (55% RPM) BAR PRESS = .760 M HG)
 (FAR FIELD NOISE) (FREE FLOW) REL HUMID = 70 %)
 () () () PAGE 26)

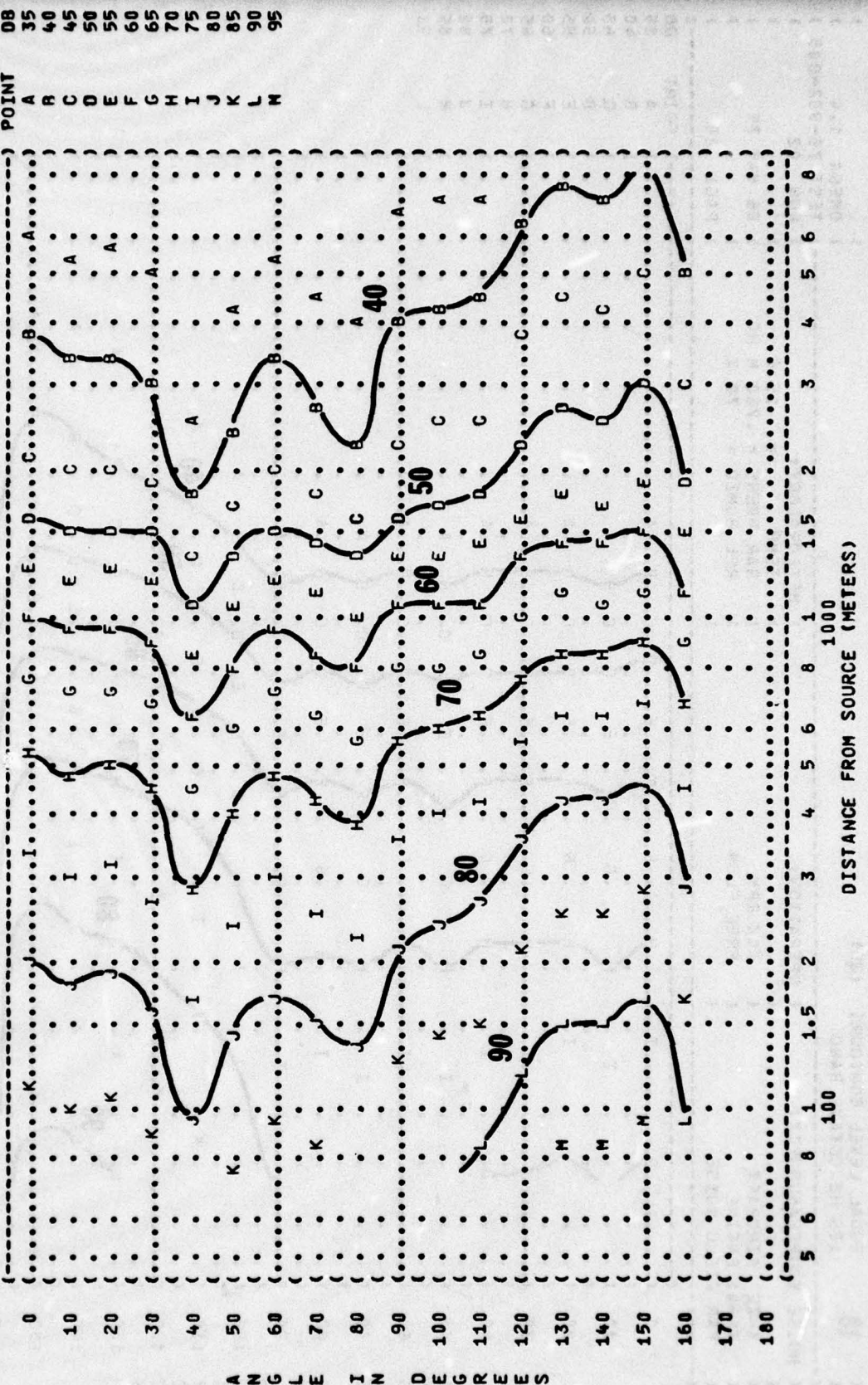


DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (EQUAL LEVEL CONTOURS (DB)
 (10 63 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (A-7E AIRCRAFT (70% RPM
 (TF-41 ENGINE (FREE FLOW
 (FAR FIELD NOISE (

) IDENTIFICATION:
) OMEGA 1.4
) TEST 75-002-005
) RUN 02
) 06 MAY 75
) PAGE 19

) METEOROLOGY:
) TEMP = 15 C
) BAR PRESS = .760 M HG
) REL HUMID = 70 %



06 MAY 75

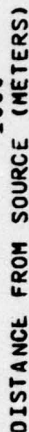
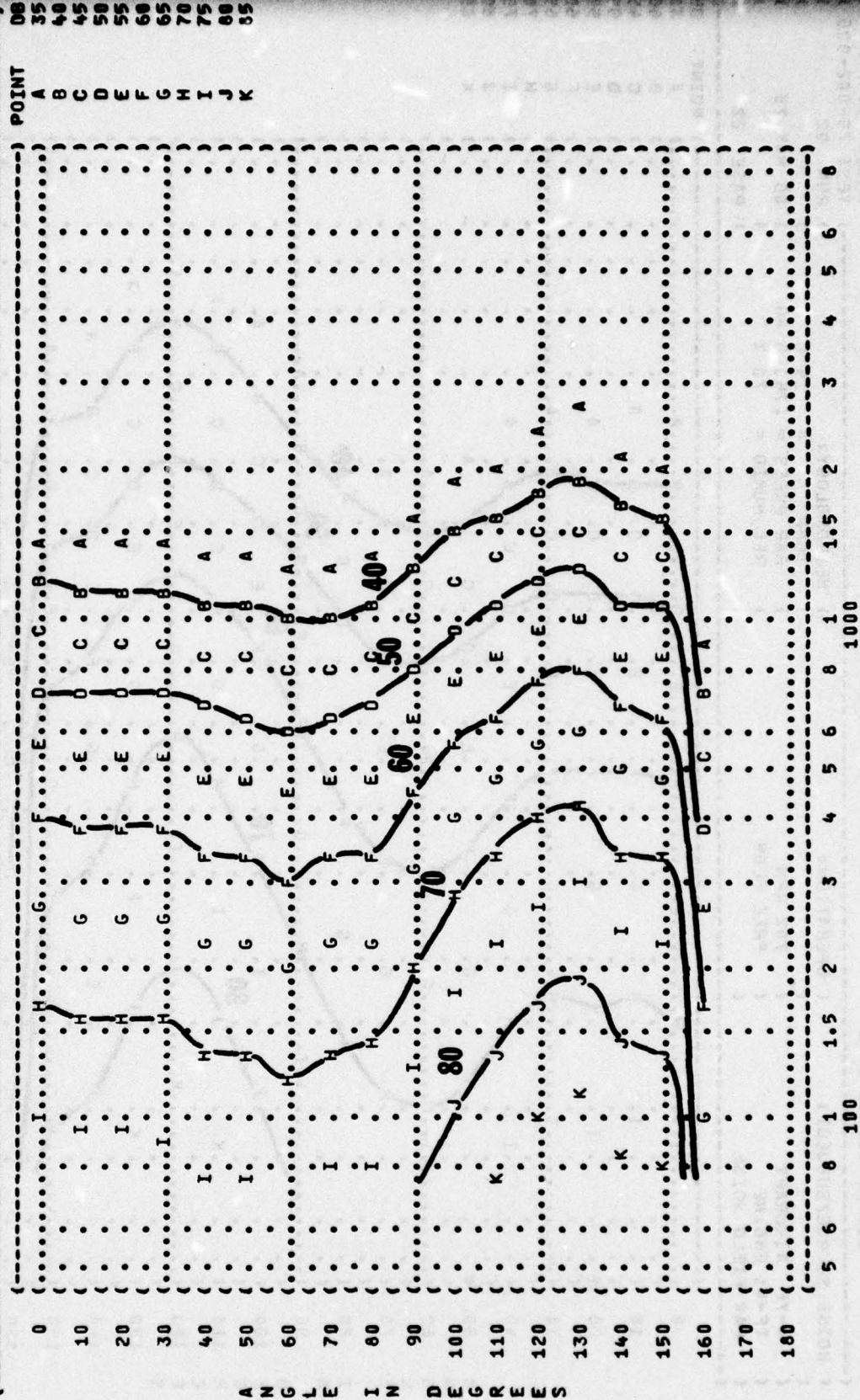


FIGURE: SOUND PRESSURE LEVEL (SPL)
 EQUAL LEVEL CONTOURS (DB)
 250 HZ OCTAVE BAND

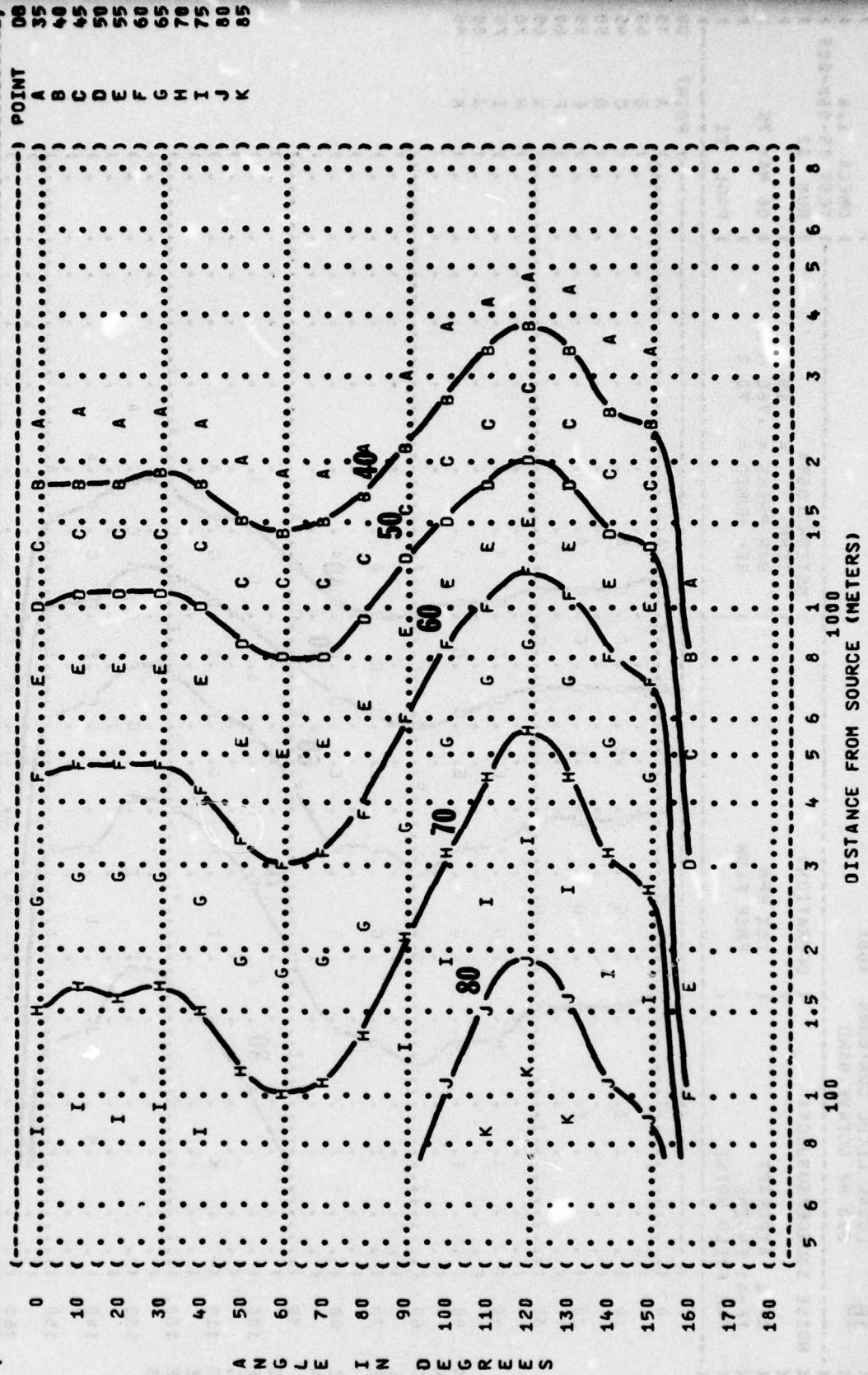
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NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 (A-7E AIRCRAFT (70% RPM) TEMP = 15 C)
 (TF-41 ENGINE (FREE FLOW) BAR PRESS = .760 H HG)
 (FAR FIELD NOISE () REL HUMID = 70 %)

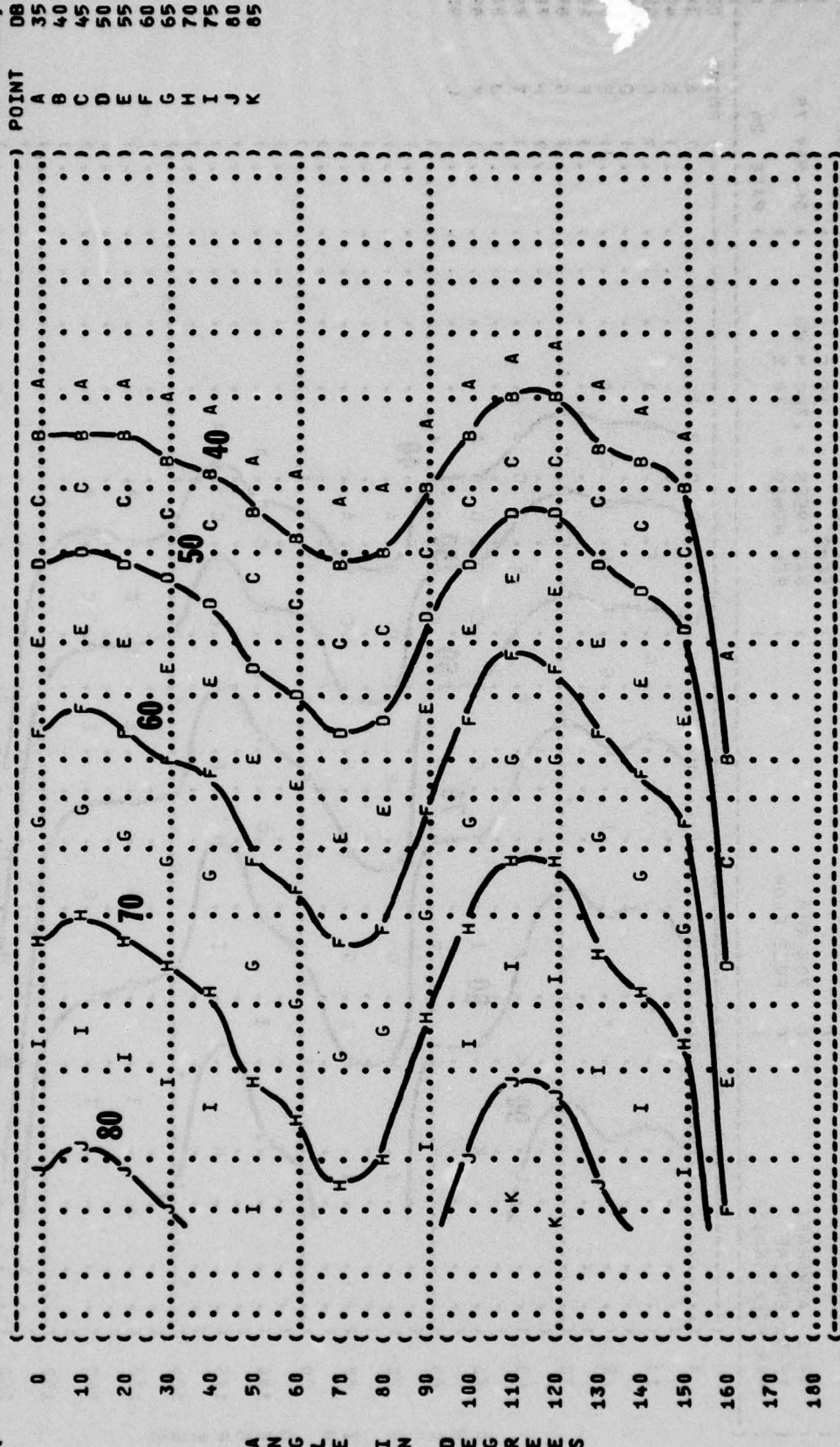
IDENTIFICATIONS:
) OMEGA 1.4
) TEST 75-002-005
) RUN 02
) 06 MAY 75
) PAGE 21



() FIGURE: SOUND PRESSURE LEVEL (SPL)
 () 10 EQUAL LEVEL CONTOURS (DB)
 () 500 HZ OCTAVE BAND
 () NOISE SOURCE/SUBJECT:
 () A-7E AIRCRAFT
 () TF-41 ENGINE
 () FAR FIELD NOISE
 () OPERATION:
 () 70% RPM
 () FREE FLOW
 () METEOROLOGY:
 () TEMP = 15 C
 () BAR PRESS = .760 M HG
 () REL HUMID = 70 %
 () IDENTIFICATION:
 () OMEGA 1.4
 () TEST 75-002-005
 () RUN 02
 () 06 MAY 75
 () PAGE 22

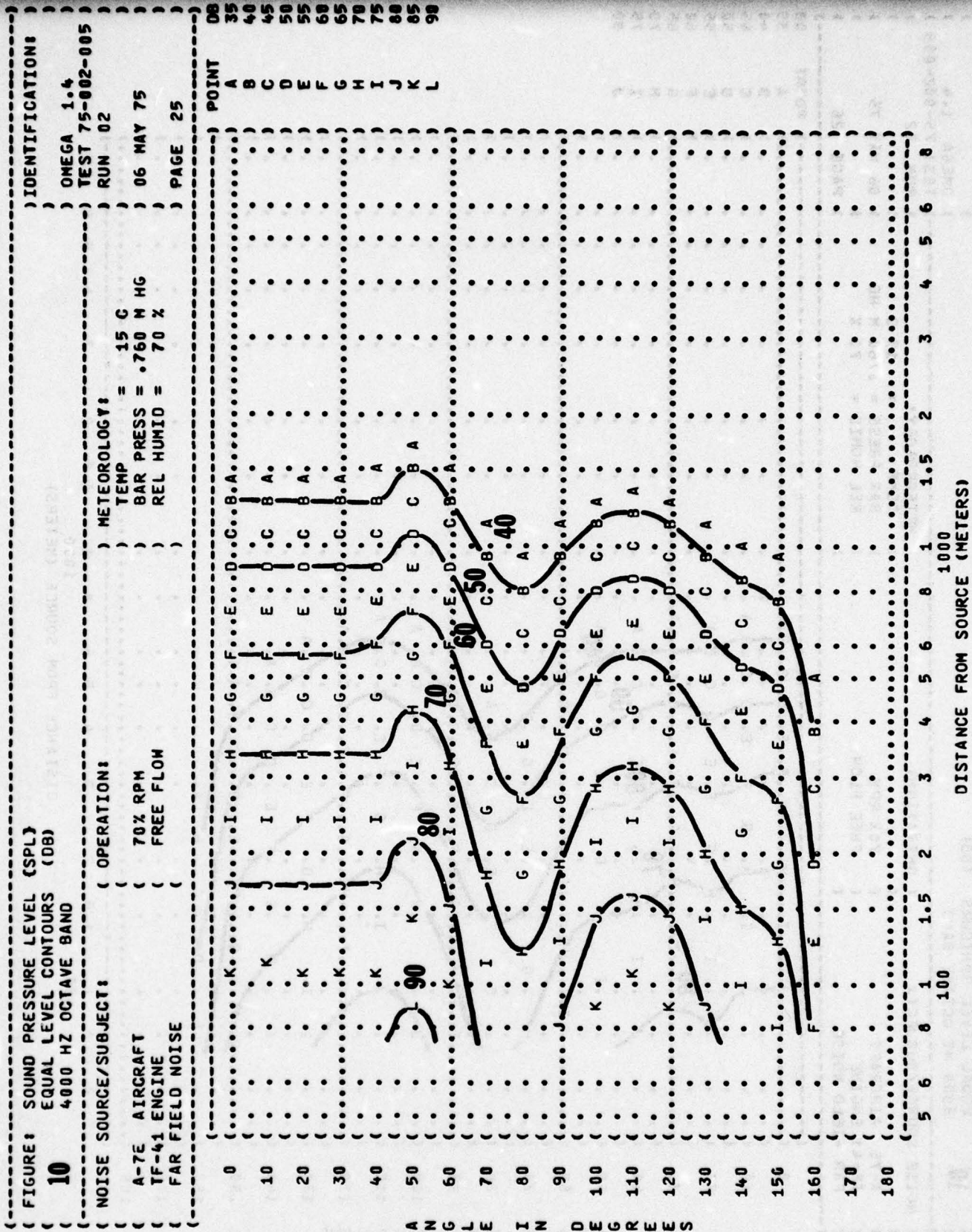


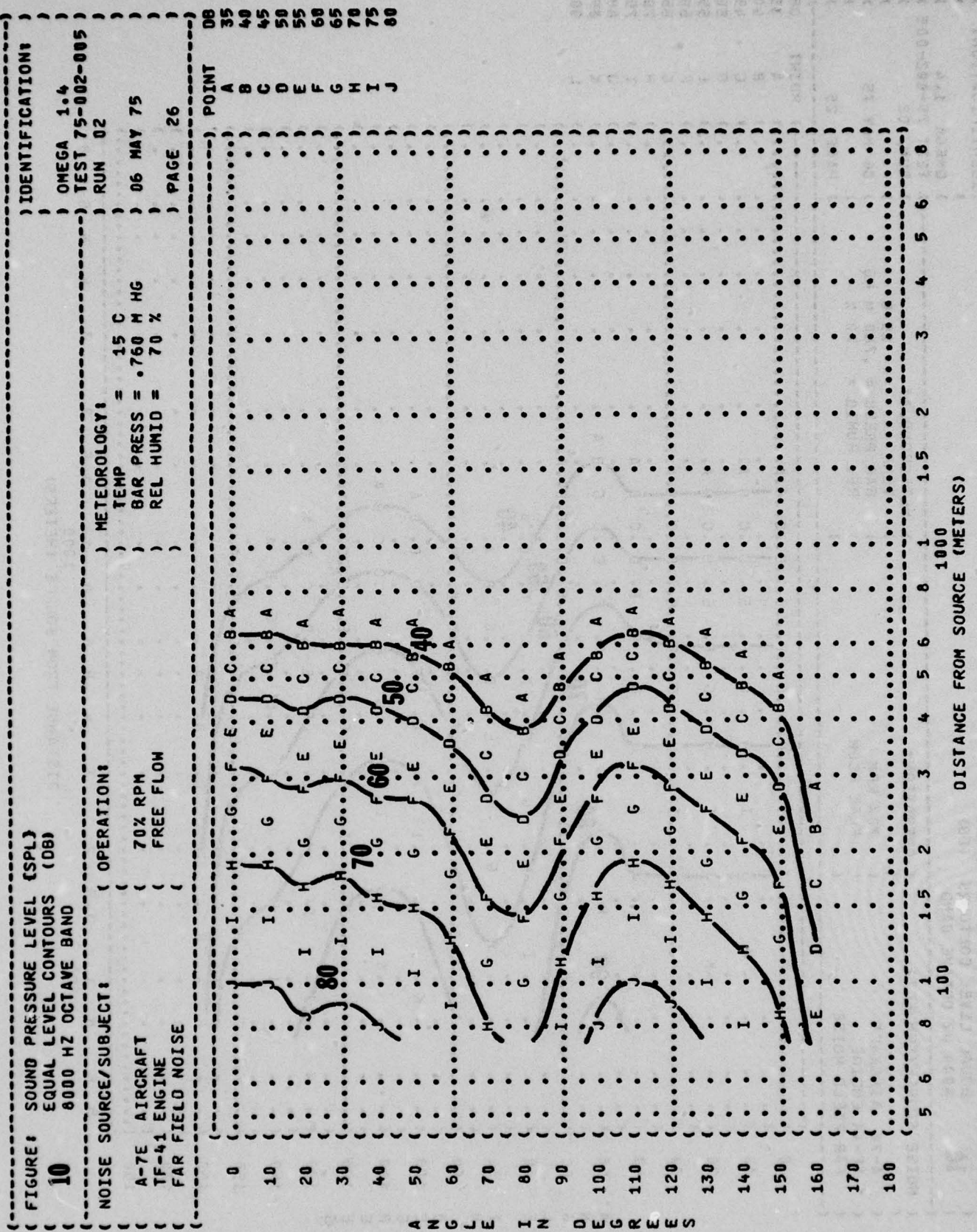
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 (1000 HZ OCTAVE BAND)
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 (TF-41 ENGINE)
 (FAR FIELD NOISE)
 (OPERATION:)
 (70% RPM)
 (FREE FLOW)
 (METEOROLOGY:)
 (TEMP = 15 C)
 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)
 (IDENTIFICATION:)
 (OMEGA 1.4)
 (TEST 75-002-005)
 (RUN 02)
 (06 MAY 75)
 (PAGE 23)



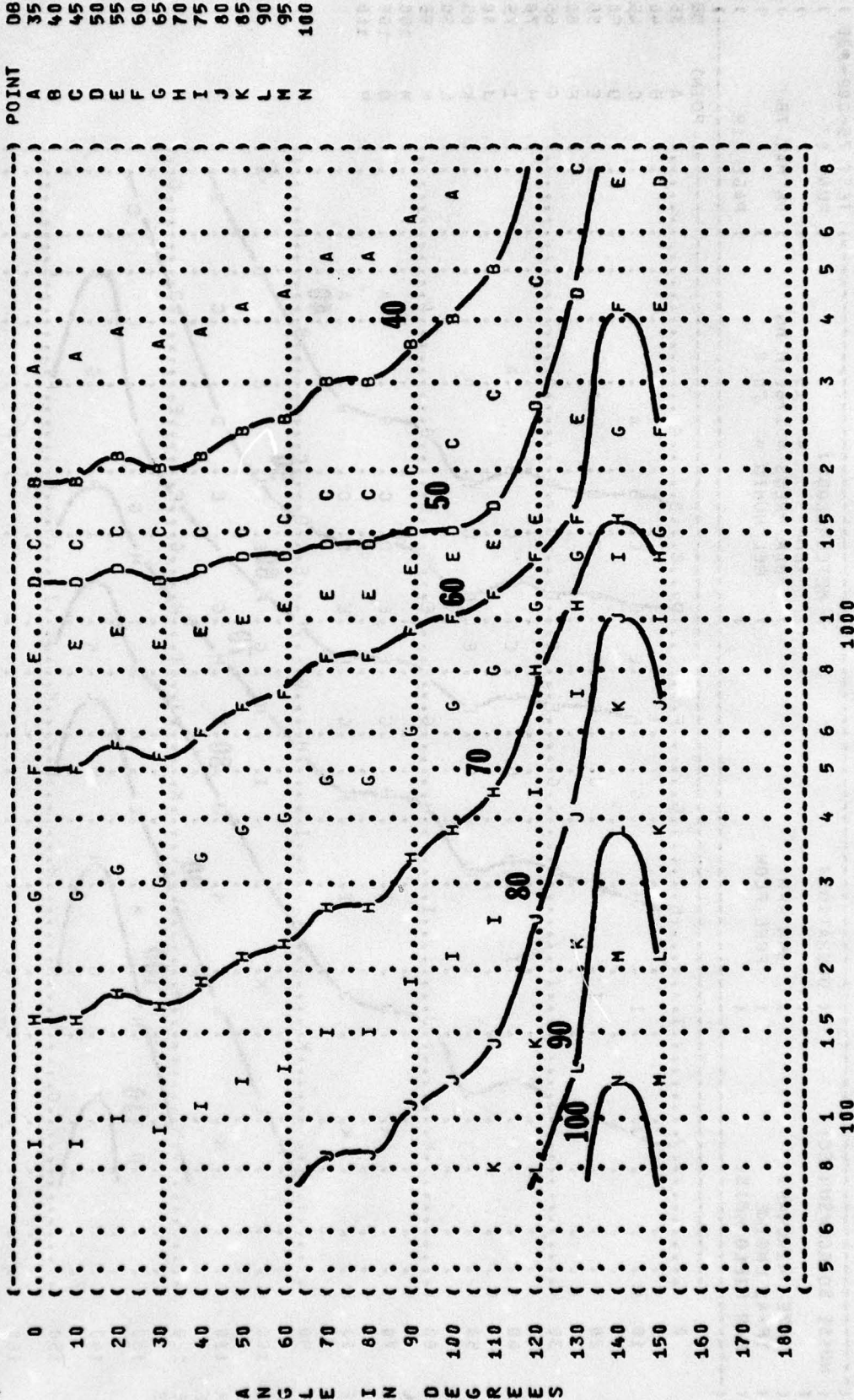
DISTANCE FROM SOURCE (METERS)

A N G L E I N D E G R E E S

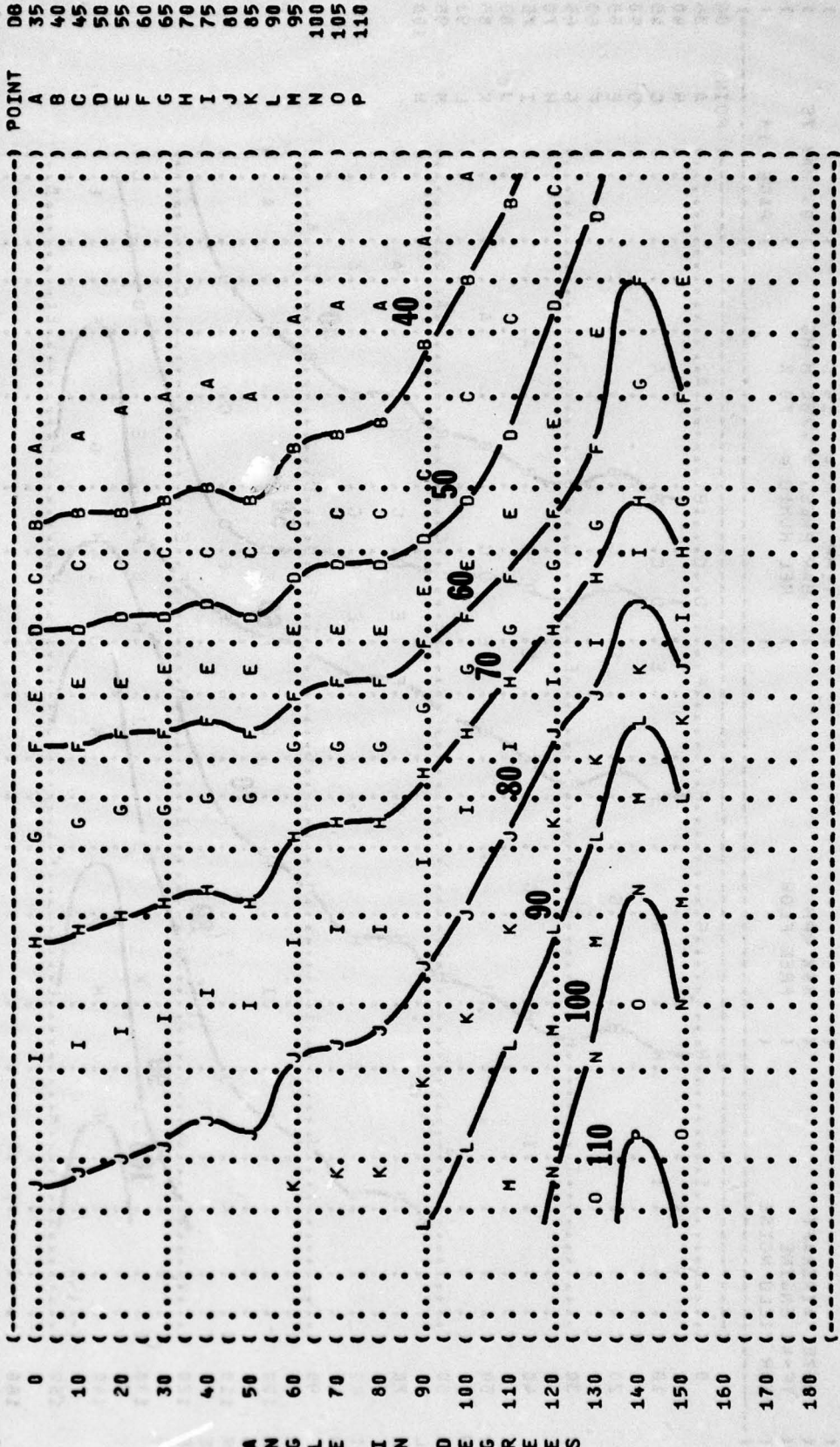




((FIGURE: SOUND PRESSURE LEVEL (SPL))
 ((EQUAL LEVEL CONTOURS (DB))
 ((10 31.5 HZ OCTAVE BAND)
 ((NOISE SOURCE/SUBJECT:)
 ((OPERATION:)
 ((A-7E AIRCRAFT)
 ((YF-41 ENGINE)
 ((FAR FIELD NOISE)
 ((METEOROLOGY:)
 ((TEMP = 15 C)
 ((BAR PRESS = .760 M HG)
 ((REL HUMID = 70 %)
 ((IDENTIFICATION:)
 ((OMEGA 1.4)
 ((TEST 75-002-005)
 ((RUN 03)
 ((06 MAY 75)
 ((PAGE 18)



(FIGURE: SOUND PRESSURE LEVEL (SPL))
 (10 EQUAL LEVEL CONTOURS (DB))
 (63 HZ OCTAVE BAND)
 (NOISE SOURCE/SUBJECT:)
 (A-7E AIRCRAFT)
 (TF-41 ENGINE)
 (FAR FIELD NOISE)
 (OPERATION:)
 (85% RPM)
 (FREE FLOW)
 (METEOROLOGY:)
 (TEMP = 15 C)
 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)
 (IDENTIFICATION:)
 (OMFGA 1.4)
 (TEST 75-002-005)
 (RUN 03)
 (06 MAY 75)
 (PAGE 19)



5 6 8 1 1.5 2 3 4 5 6 8
 100
 1000
 DISTANCE FROM SOURCE (METERS)

A N C L E I N D E G R E E S

IDENTIFICATION: OMEGA 1.4
 TEST 75-002-005
 RUN 03
 06 MAY 75
 PAGE 21

METEOROLOGY:
 TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %

OPERATION:
 85% RPM
 FREE FLOW

NOISE SOURCE/SUBJECT:
 A-7E AIRCRAFT
 TF-41 ENGINE
 FAR FIELD NOISE

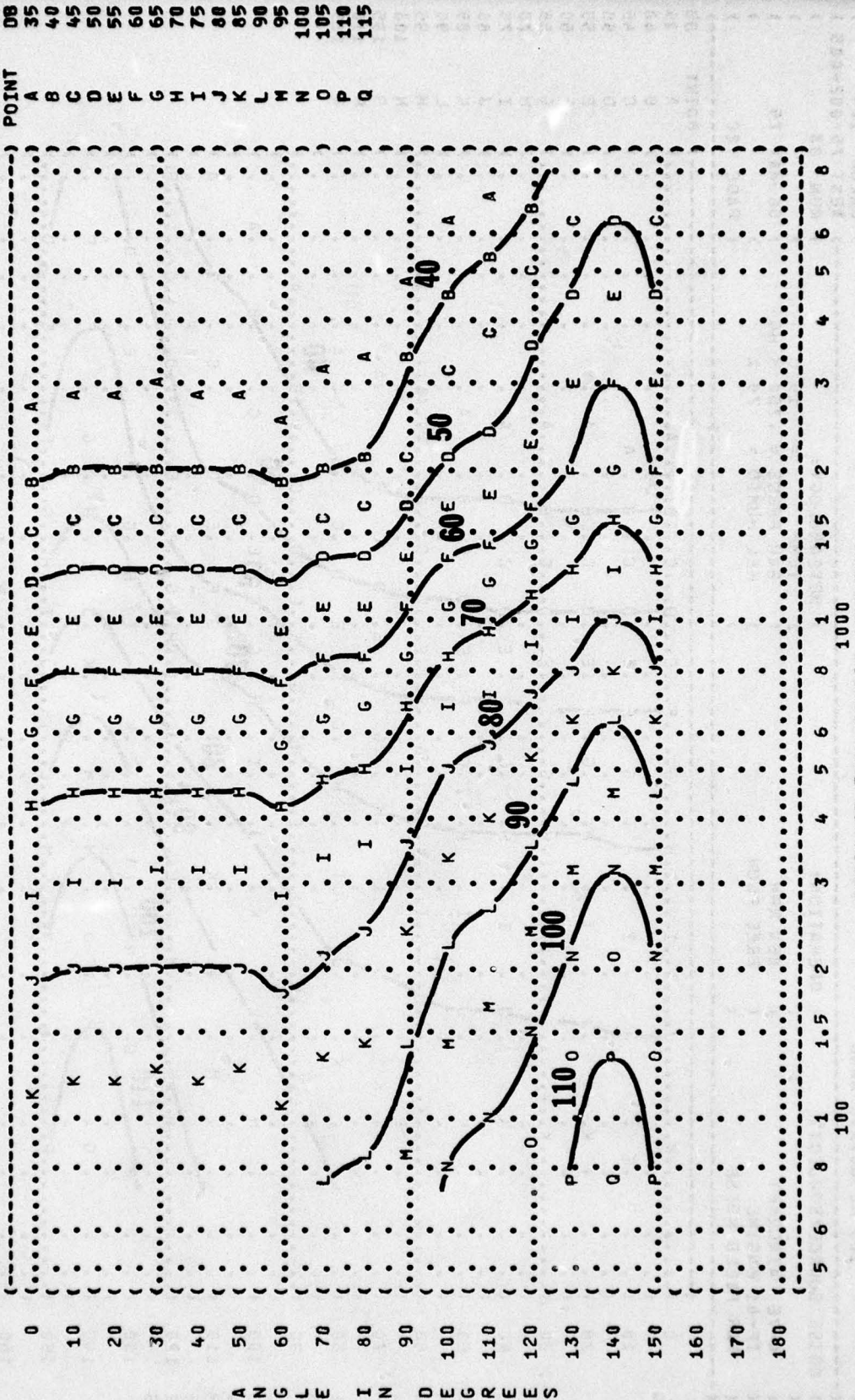
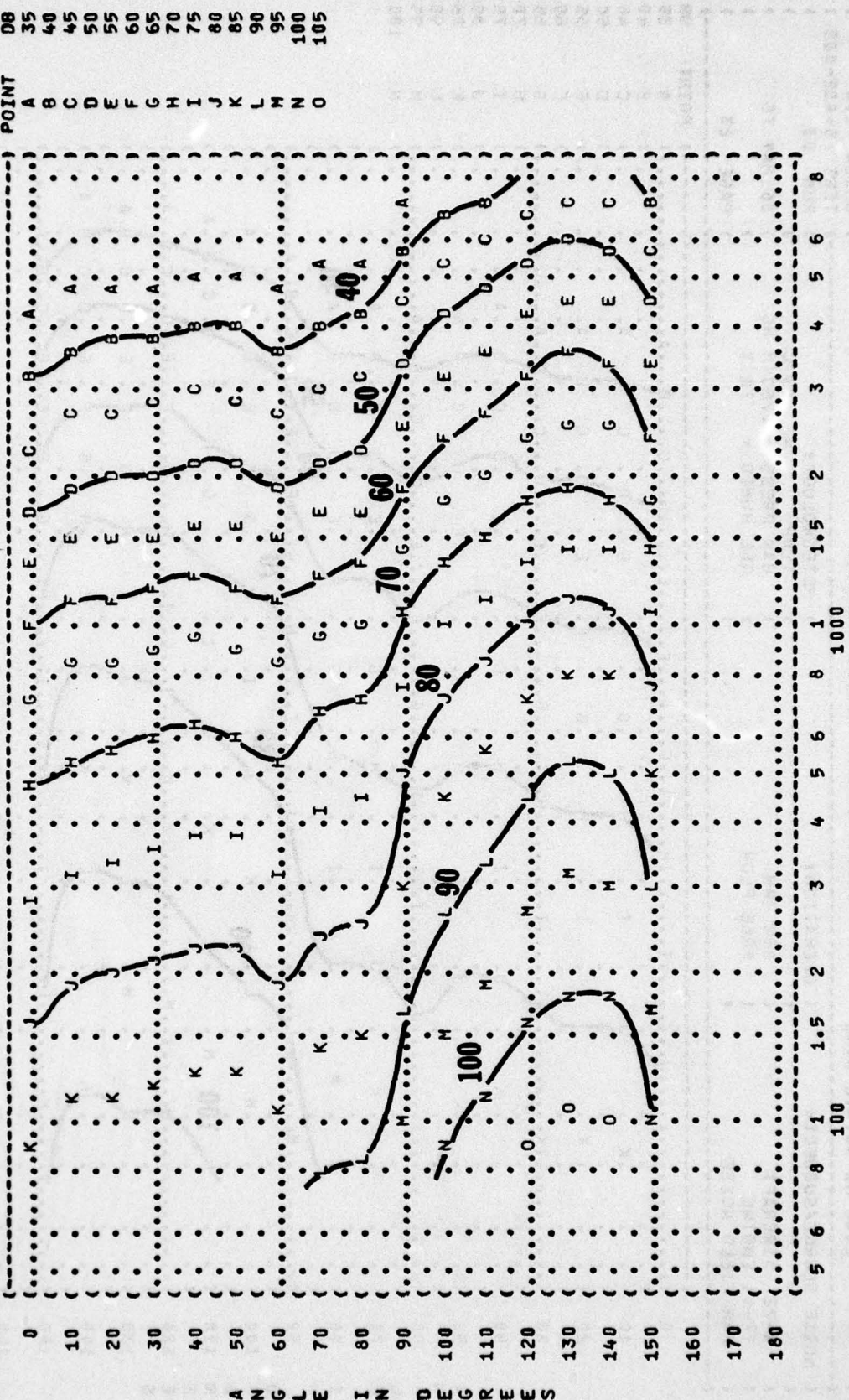


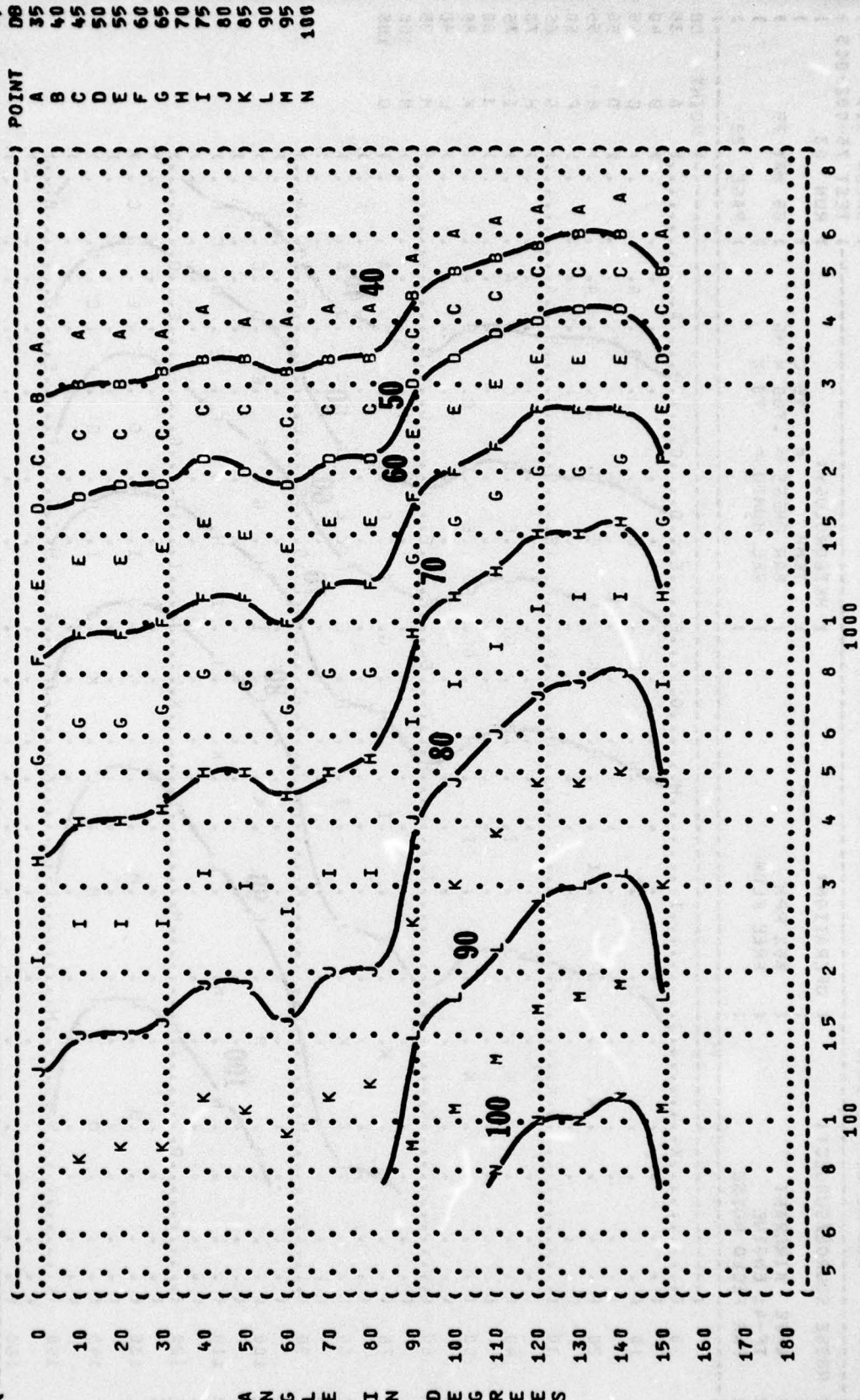
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 EQUAL LEVEL CONTOURS (DB)
 500 HZ OCTAVE BAND
 NOISE SOURCE/SUBJECT: (OPERATION:
 A-7E AIRCRAFT (85% RPM
 TF-41 ENGINE (FREE FLOW
 FAR FIELD NOISE ()
 METEOROLOGY:
 TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 IDENTIFICATION:
 OMEGA 1.4
 TEST 75-002-005
 RUN 03
 06 MAY 75
 PAGE 22



DISTANCE FROM SOURCE (METERS)

ANGLED IN DEGREE S

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (10 EQUAL LEVEL CONTOURS (DB)
 (1000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (A-7E AIRCRAFT (85% RPM
 (TF-41 ENGINE (FREE FLOW
 (FAR FIELD NOISE ()
 () METEOROLOGY:
 () TEMP = 15 C
 () BAR PRESS = .760 M HG
 () REL HUMID = 70 %
 () PAGE 23
 () IDENTIFICATION:
 () OMEGA 1.4
 () TEST 75-002-005
 () RUN 03



DISTANCE FROM SOURCE (METERS)

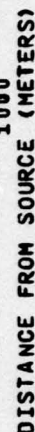
A N G L E I N D E G R E E S

IDENTIFICATION:)
OMEGA 1.4)
TEST 75-002-005)

METEOROLOGY:

TEMP = 15 C
BAR PRESS = .760 M HG
REL HUMID = 70 %

PAGE 24

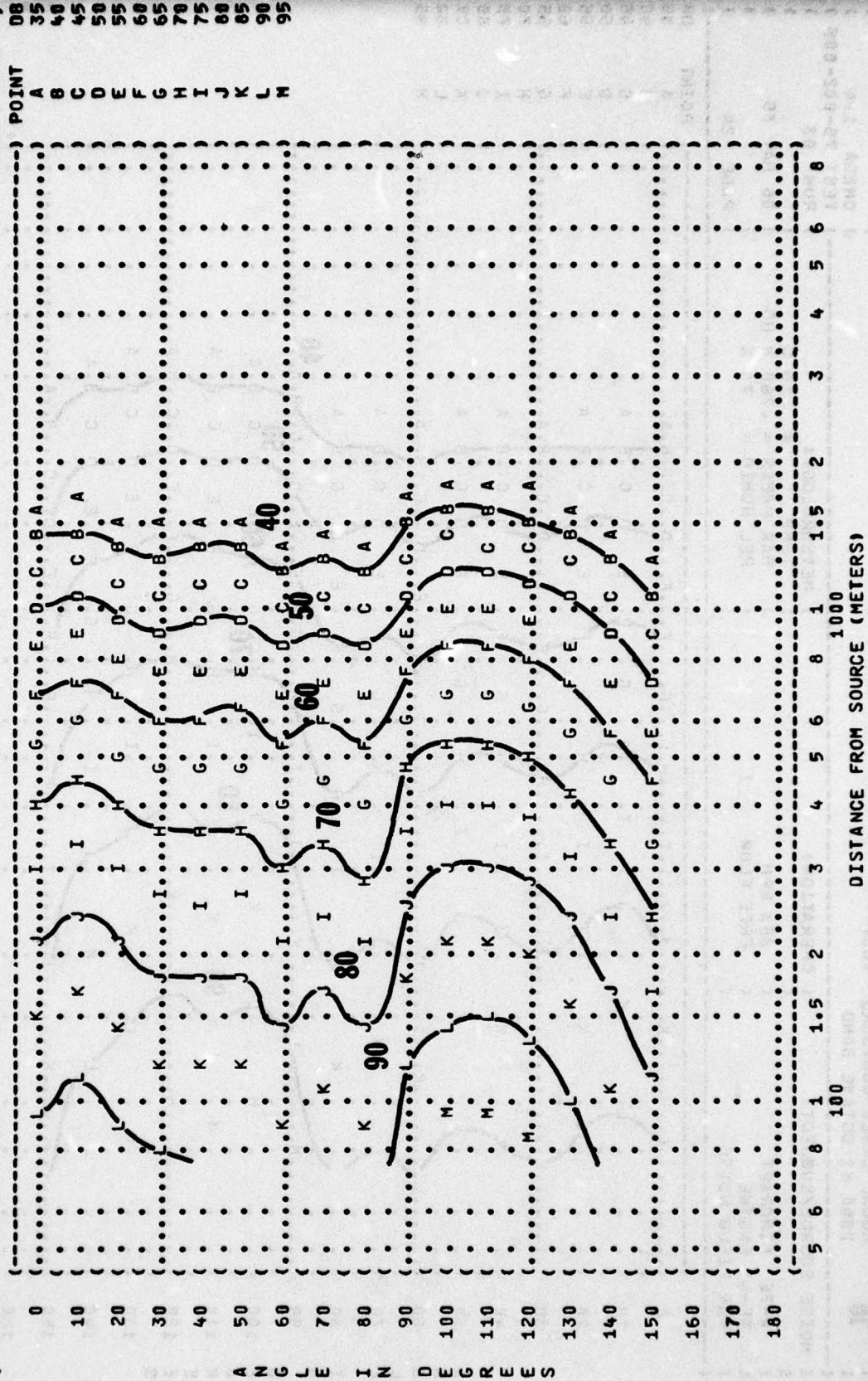


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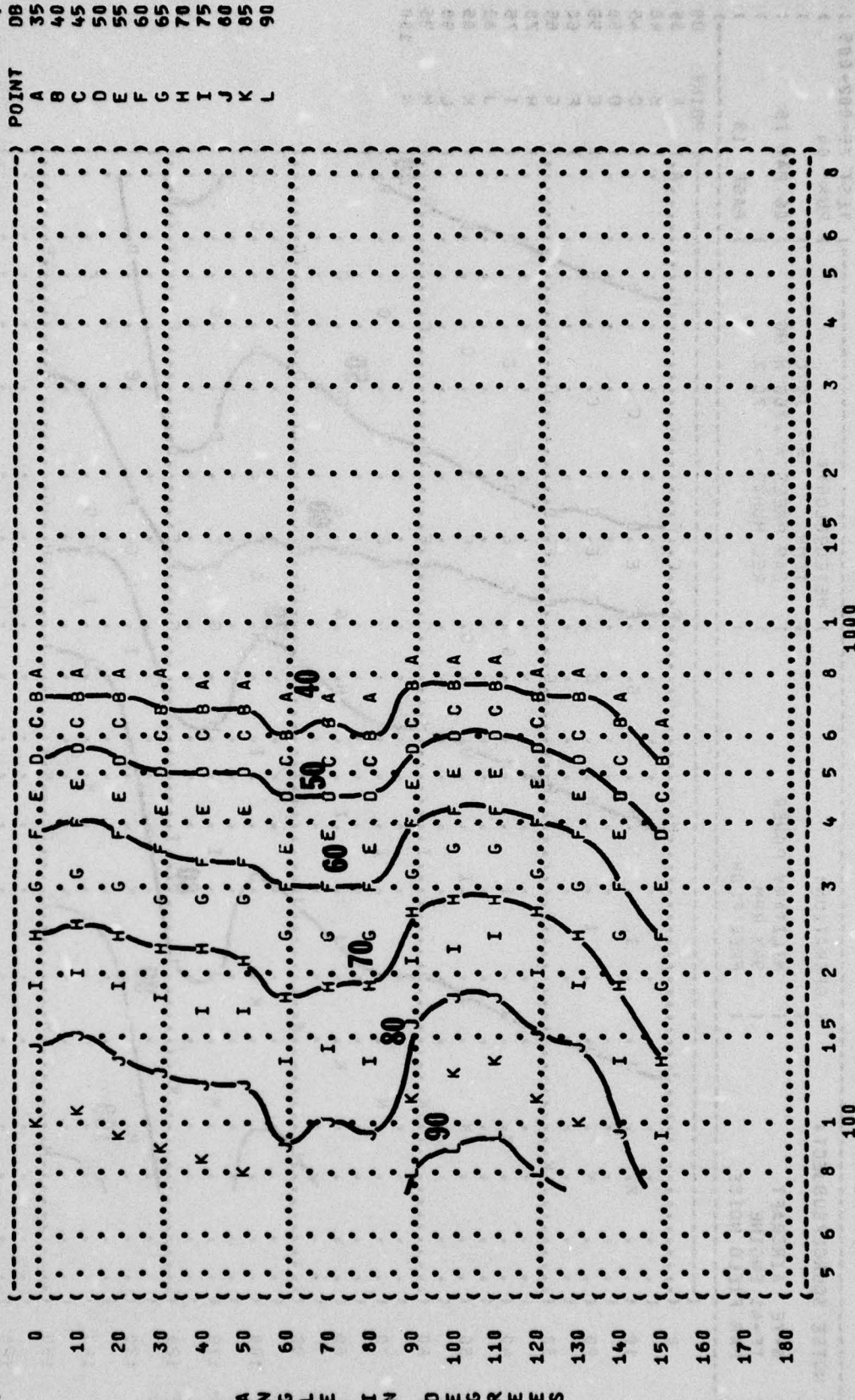
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 (TF-41 ENGINE (FREE FLOW
 (FAR FIELD NOISE (

) IDENTIFICATION:
) OMEGA 1.4
) TEST 75-002-005
) RUN 03
) 06 MAY 75
) PAGE 25

) METEOROLOGY:
) TEMP = 15 C
) BAR PRESS = .760 H HG
) REL HUMID = 70 %

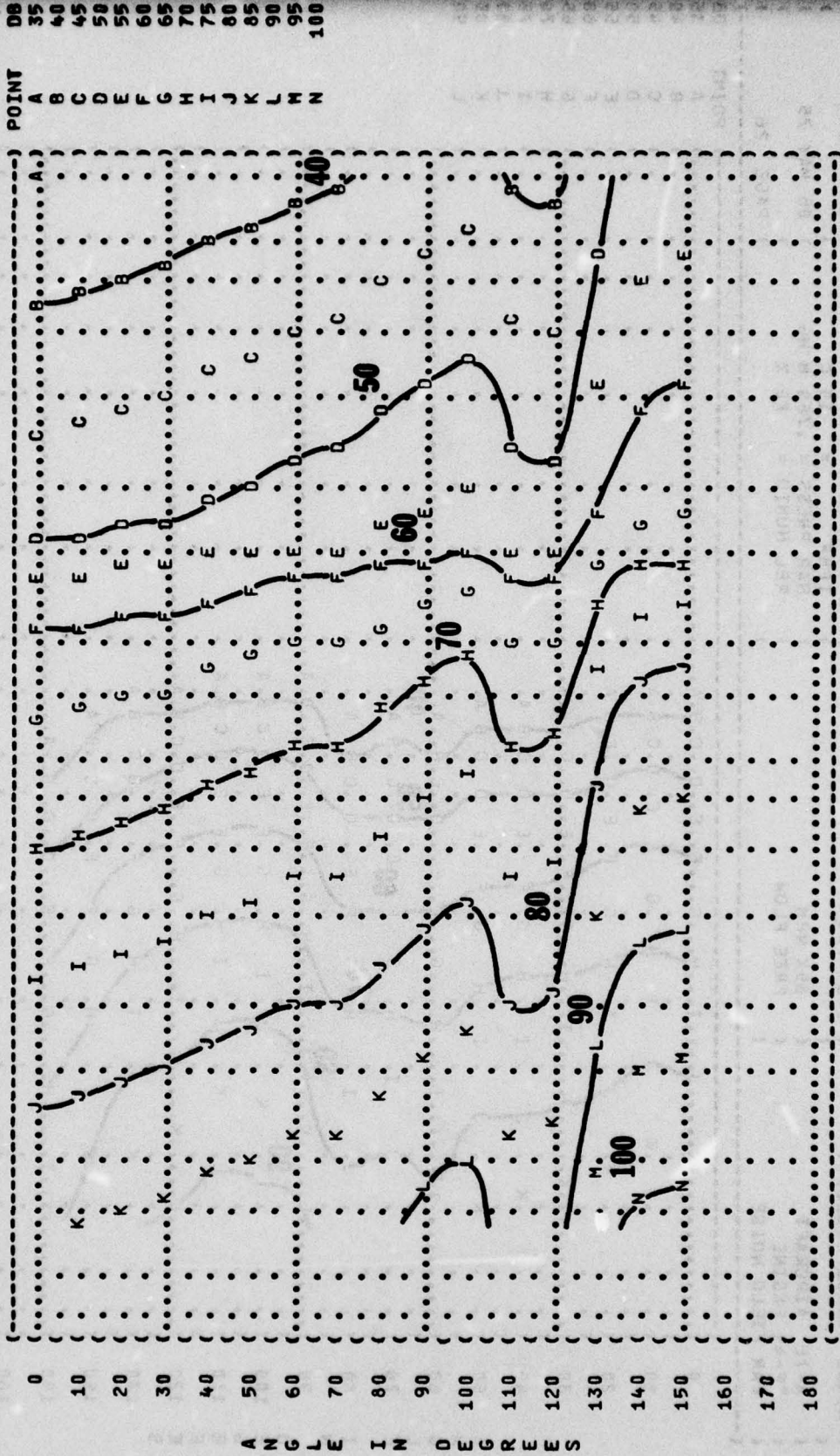


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 (8000 HZ OCTAVE BAND
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 (A-7E AIRCRAFT (85% RPM (TEMP = 15 C () OMEGA 1.4
 (TF-41 ENGINE (FREE FLOW (BAR PRESS = .760 M HG () TEST 75-002-005
 (FAR FIELD NOISE () REL HUMID = 70 % () RUN 03
 () PAGE 26 () 06 MAY 75
 ()



DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (10 EQUAL LEVEL CONTOURS (DB)
 (31.5 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
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 (TF-41 ENGINE (94% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
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 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
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 (TEST 75-002-005
 (RUN 04
 (06 MAY 75
 (PAGE 18



DISTANCE FROM SOURCE (METERS)

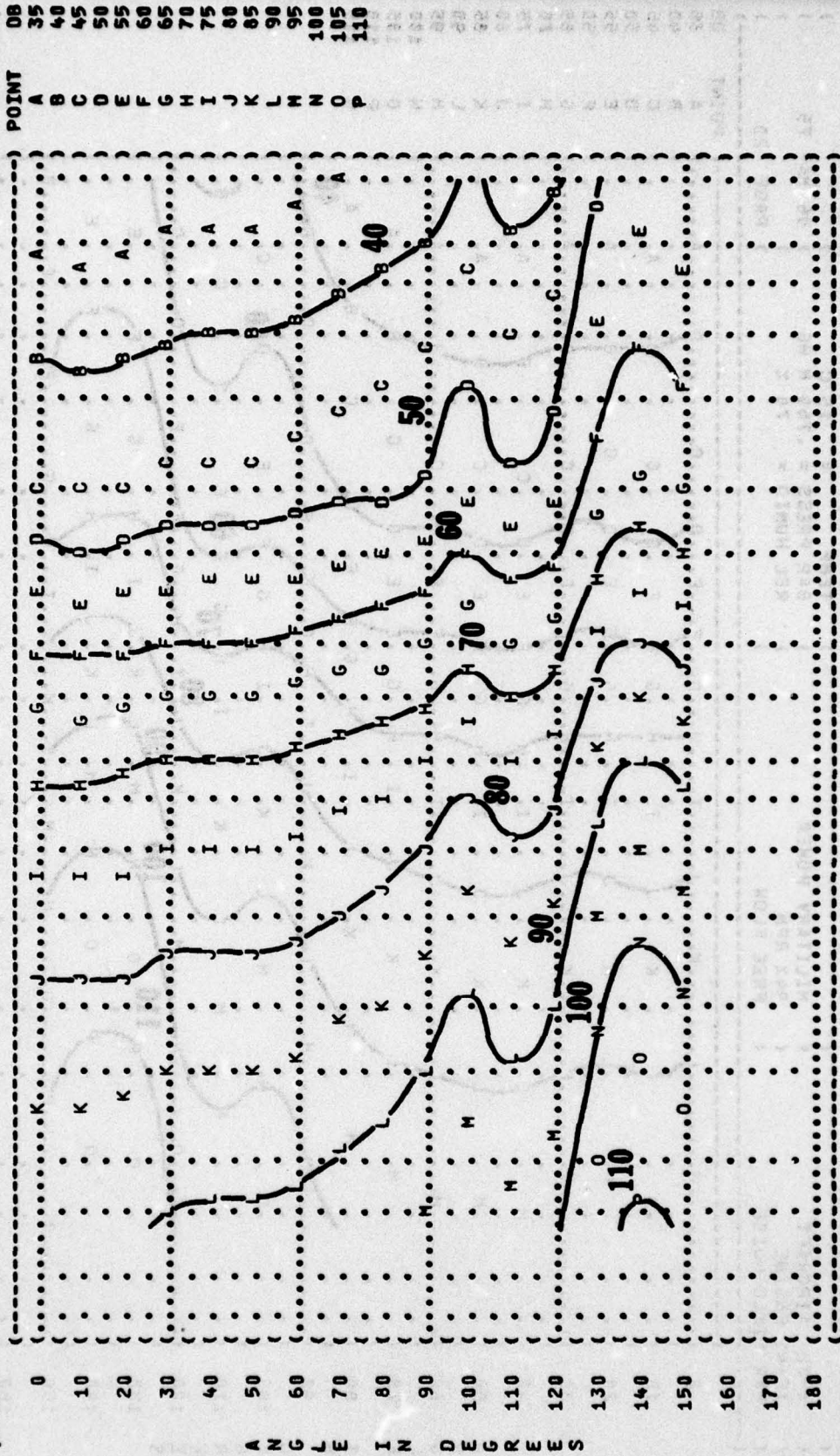
ANGLES IN DEGREES

IDENTIFICATION:
 OMEGA 1.4
 TEST 75-002-005
 RUN 04
 06 MAY 75
 PAGE 19

METEOROLOGY:
 TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %

OPERATION:
 MILITARY POWER
 94% RPM
 FREE FLOW

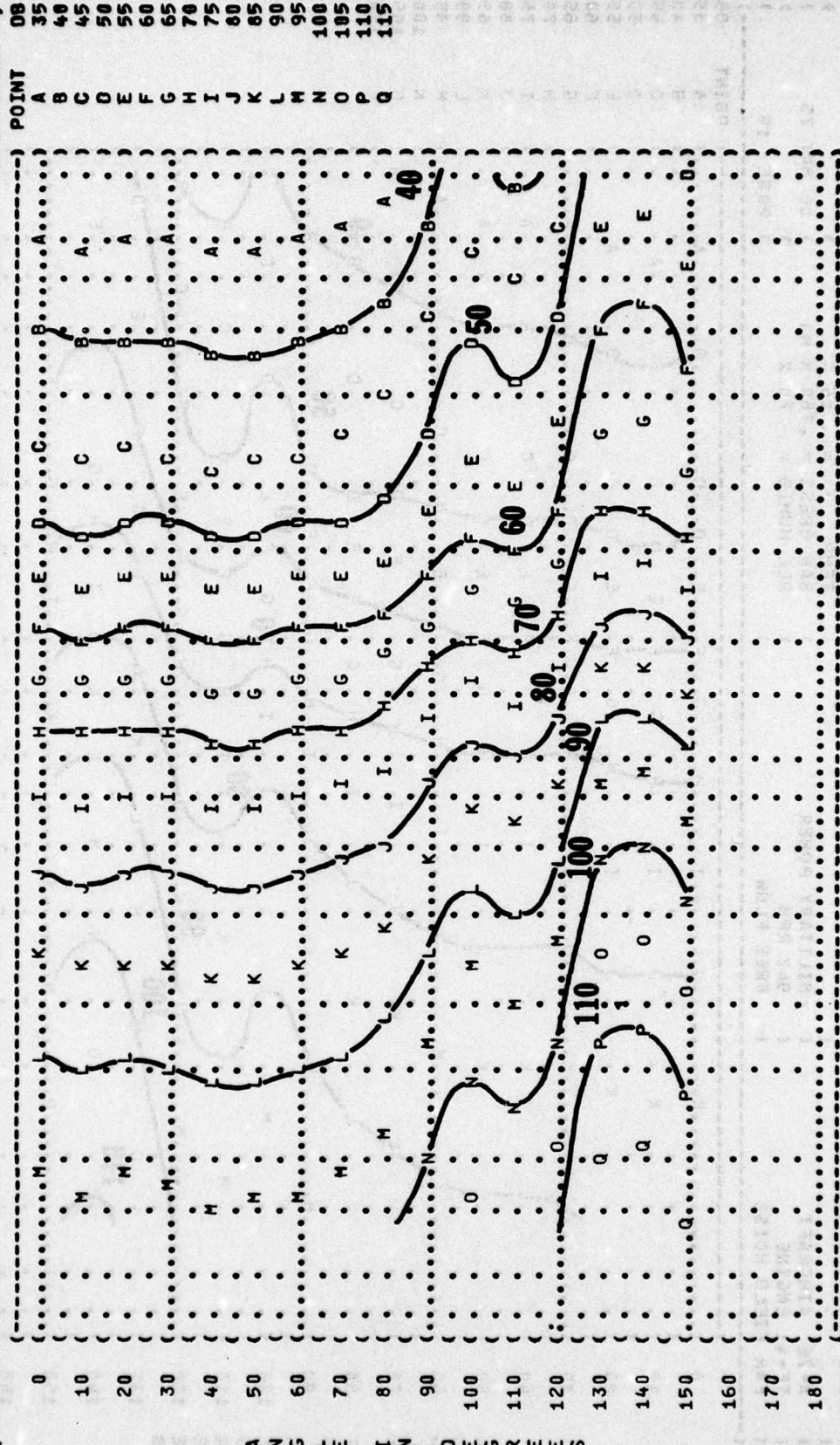
NOISE SOURCE/SUBJECT:
 A-7E AIRCRAFT
 TF-41 ENGINE
 FAR FIELD NOISE



POINT
 A 35
 B 40
 C 45
 D 50
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 G 65
 H 70
 I 75
 J 80
 K 85
 L 90
 M 95
 N 100
 O 105
 P 110

DISTANCE FROM SOURCE (METERS)

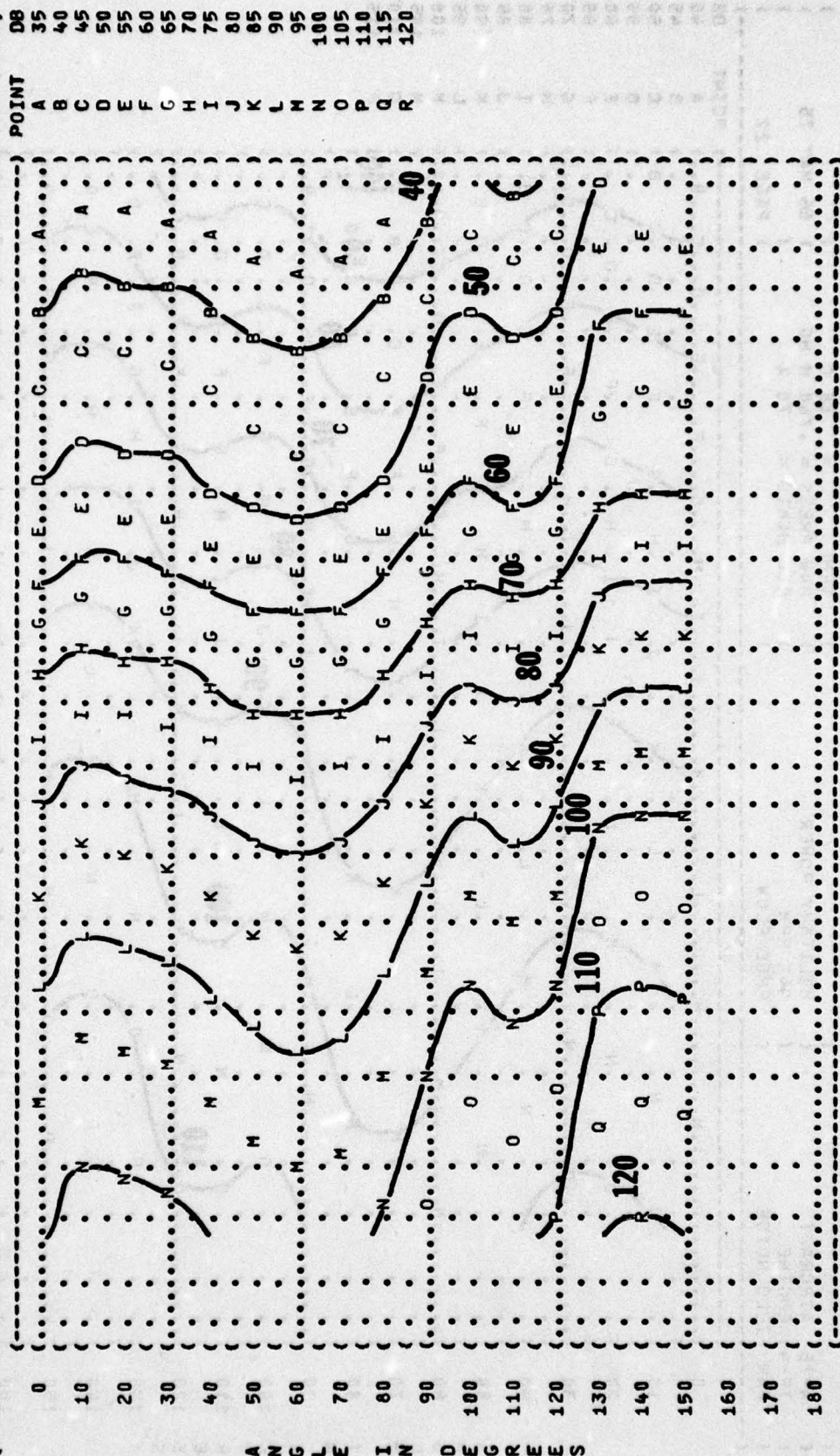
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 (TF-41 ENGINE (94% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (PAGE 20
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 04
 (06 MAY 75
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DISTANCE FROM SOURCE (METERS)

A N G L E I N D E G R E E S

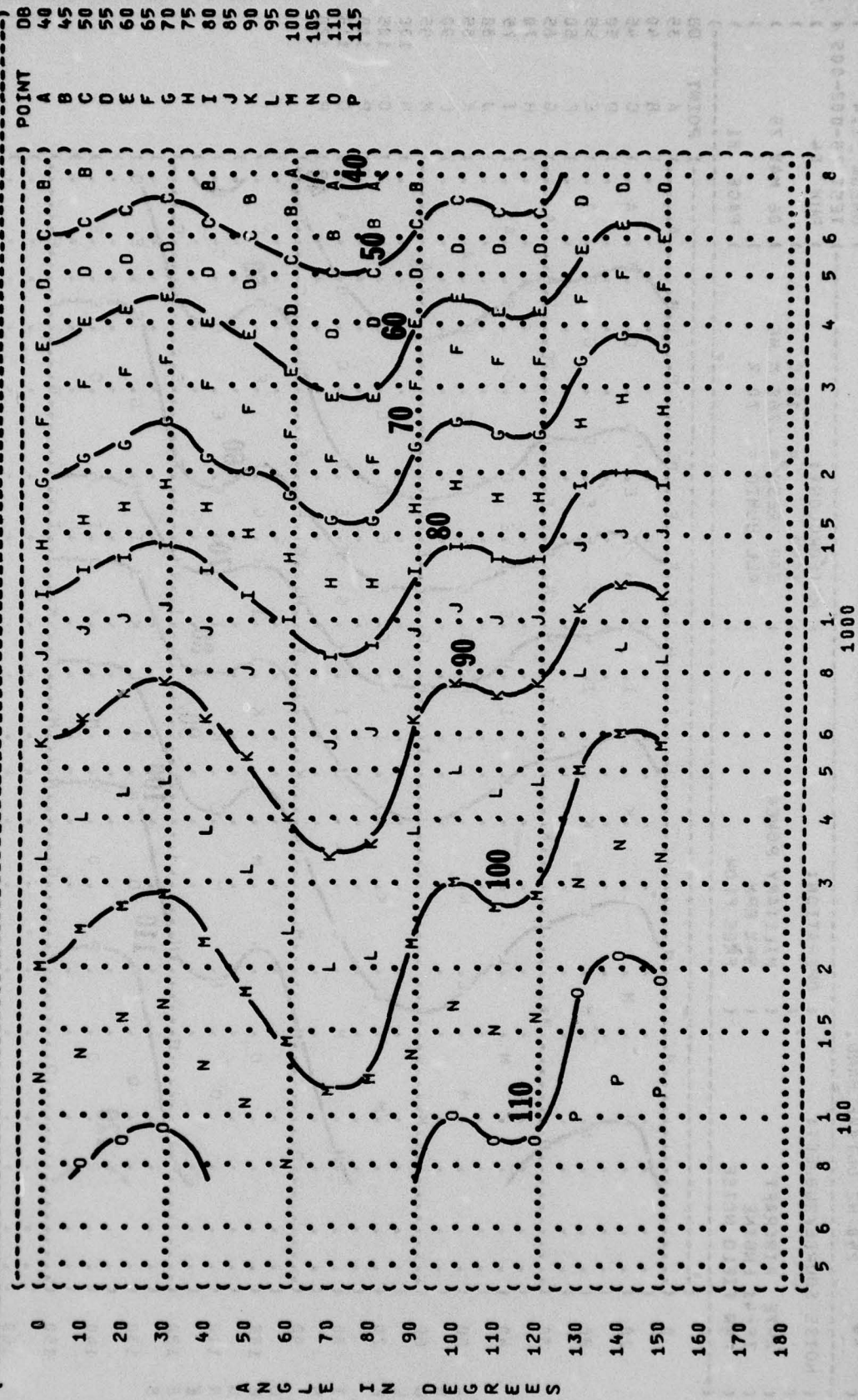
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 TEST 75-002-005
 RUN 04
 METEOROLOGY:
 TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 OPERATION:
 MILITARY POWER
 94% RPM
 FREE FLOW
 NOISE SOURCE/SUBJECT:
 A-7E AIRCRAFT
 TF-41 ENGINE
 FAR FIELD NOISE



DISTANCE FROM SOURCE (METERS)
 0 1 1.5 2 3 4 5 6 7 8
 100 1000

A N G L E I N D E G R E E S

(FIGURE: SOUND PRESSURE LEVEL [SPL])
 (11 EQUAL LEVEL CONTOURS (DB))
 (500 HZ OCTAVE BAND)
 (NOISE SOURCE/SUBJECT:)
 (A-7E AIRCRAFT)
 (TF-41 ENGINE)
 (FAR FIELD NOISE)
 (OPERATION:)
 (MILITARY POWER)
 (94% RPM)
 (FREE FLOW)
 (METEOROLOGY:)
 (TEMP = 15 C)
 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)
 (IDENTIFICATION:)
 (OMEGA 1.4)
 (TEST 75-002-005)
 (RUN 04)
 (06 MAY 75)
 (PAGE 22)



DISTANCE FROM SOURCE (METERS)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-000
RUN 04
06 MAY 75
PAGE 24

.....

0 METEOROLOGY:

MILITARY POWER

94% RPM

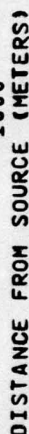
FREE FLOW

TEMP = 15 C

BAR PRESS = .760 M

PAGE 24

DB	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
JINT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P



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AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OHIO F/G 20/1
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 96. A-7E AIRC--ETC(U)
JUN 77 R G POWELL

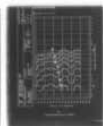
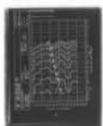
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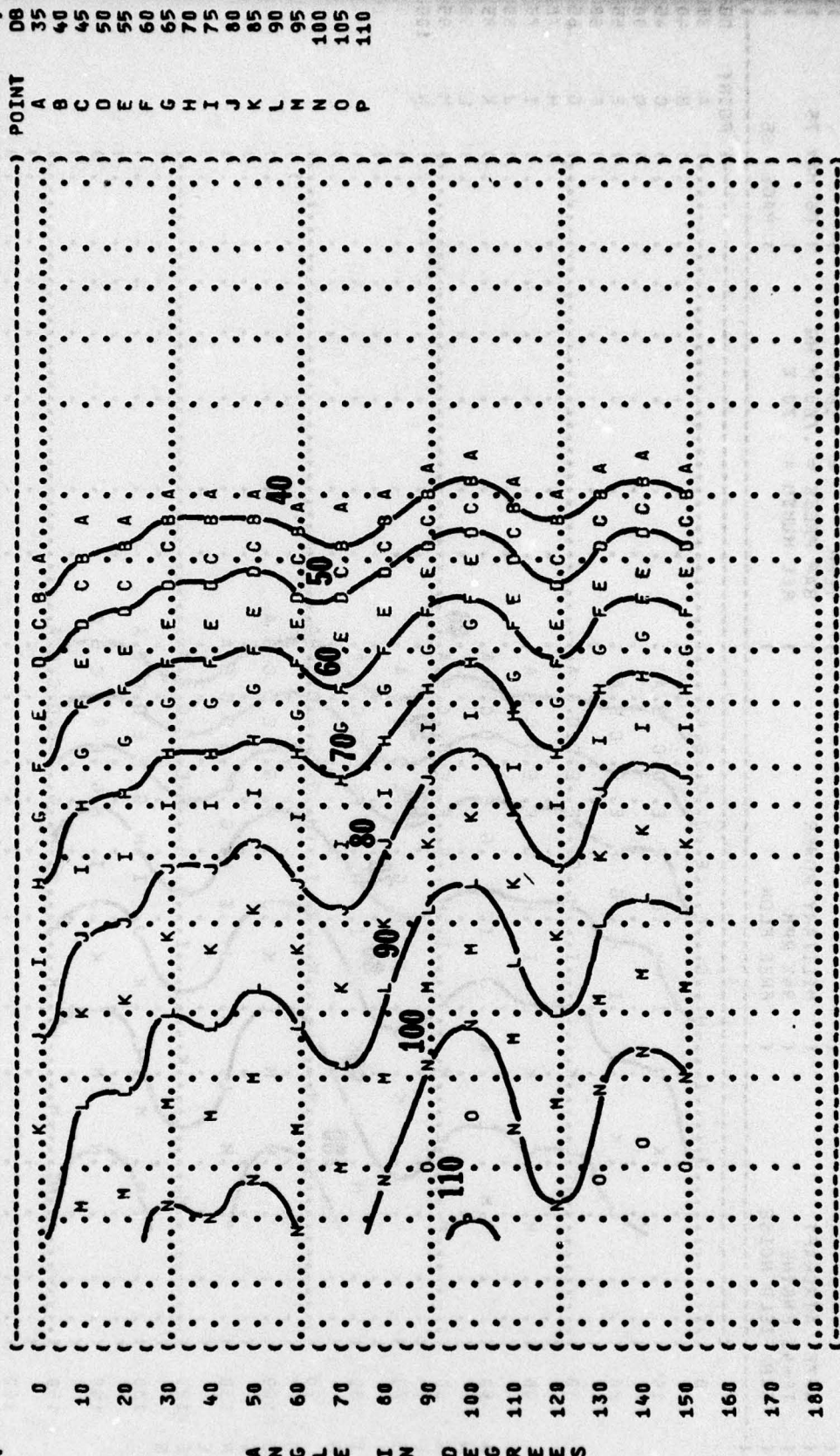


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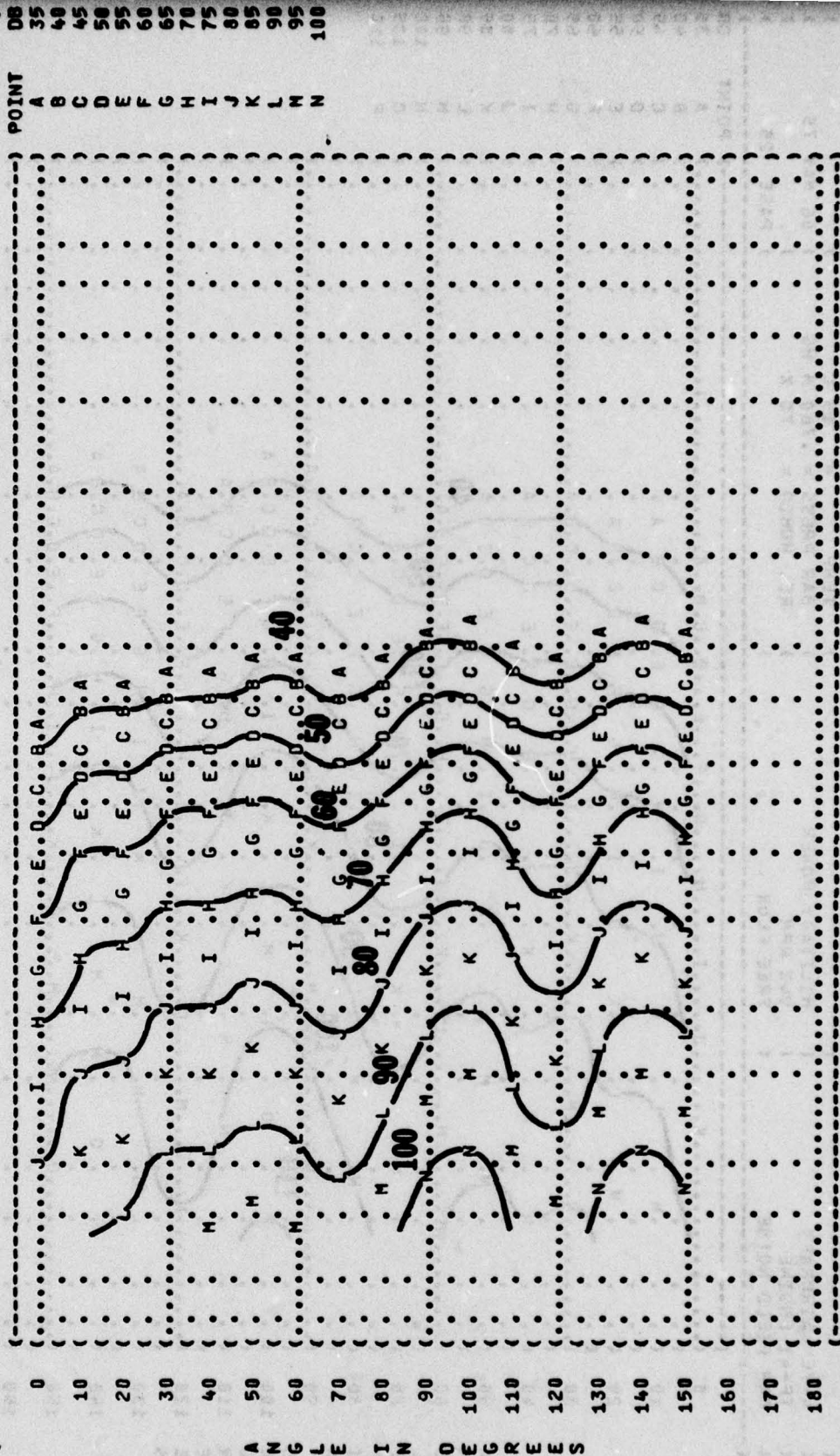
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(FIGURE: SOUND PRESSURE LEVEL (SPL)
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 (4000 HZ OCTAVE BAND
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 (TF-41 ENGINE (94% RPM
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 04
 (06 MAY 75
 (PAGE 25



5 6 8 1 1.5 2 3 4 5 6 8
 100
 1000
 DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (10 EQUAL LEVEL CONTOURS (DB)
 (8000 HZ OCTAVE BAND
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 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 75-002-005
 (RUN 04
 (06 MAY 75
 (PAGE 26



DISTANCE FROM SOURCE (METERS)